Stability and Prosperity Will Continue

THE death of President Harding at San Francisco, August 2nd, was a big shock to the entire country. The spectacular route of the funeral train from the Pacific Coast to Washington, through a lane of mourning people, is a most eloquent tribute to the integrity and character of a beloved president. It is well that the people of the United States take off their hats and bare their heads in respect to the memory of this constructive leader.

While the business interests of the country have lost in President Harding a man who performed the Herculean task of reconstruction—the most marvelous in the country's history—and brought business from a state of chaos and loss in 1921 to a high state of prosperity in 1923, yet again, due to his foresight and splendid business instinct, his policies are handed on to a worthy successor, Calvin Coolidge. At the invitation of President Harding, he has sat in every Cabinet meeting since the Harding Administration began to function in March, 1921.

The consensus of opinion of the financial, commercial, industrial and agricultural divisions in the United States is that the country's business will suffer no setback, due to the tragic and sudden removal of the President. All honor, then, is due the memory of the late president from the business interests of the country, and it is fitting that the first act of his successor should be to set aside Friday, August 10th, as a day of mourning, and eminently gratifying that the business interests of the country should decide almost unanimously to close that day, evidencing their respect and honor to the memory of what President Harding contributed to the restoration of prosperity in America.

Never were the business interests of the country so sound; never were the financial institutions of the country in better condition to meet the demands of financing the great crops which the country has produced and which are now in process of harvesting.

The transportation systems of the country have girded themselves for the great tonnage they will be called upon to move this fall, thereby assuring a continuance of earnings to the railroads and prosperous employment to their millions of employees.

The industries of the country are generally busy; there are no excess stocks of commodities either in the hands of jobbers or consumers anywhere. Due to the warnings which have been so generally circulated since last April—that business was liable to fall off during the summer—all commercial concerns and ultimate consumers are entering the fall with low stocks and in a healthy condition to purchase.

The labor situation is particularly gratifying. There is no excess labor anywhere. Nineteen hundred and twenty-three will probably go down in history as the year in which the greatest number of people were employed at the highest wages during peace times. The cost of living has gradually sunk while wages and earnings have been maintained, and in a number of instances have increased. There never was a time in the history of the country in which there has been so large a margin in favor of the wage earner between the cost of living and the wages received. The wage earner is prosperous, and being prosperous he is in a position to buy and maintain a standard of living which insures a continuance of prosperous business in this country.

The paper industry in some divisions has suffered during the past two months from a lull of business, but beginning this month, reports from all the various commercial agencies show that business in general is beginning to emerge from the summer dullness. There will be a big prosperous demand for commodities this fall, and it is to the interest of every consumer of paper to make his purchases now. We have seen too many times in recent years how profits can be missed by throwing too great a demand for too large a volume of commodities upon the static factory capacity of the United States.

In 1921, every producer of commodities was complaining bitterly because they were doing business at a loss. Today, the balance in industry is so great, in large part due to the wise, economic policies of the Harding-Coolidge Administration, that almost without exception every producer of commodities can exchange his products with all other commodities and make a profit. We can see nothing at this writing to change this stable situation. Stable prices and continued prosperity are assured.

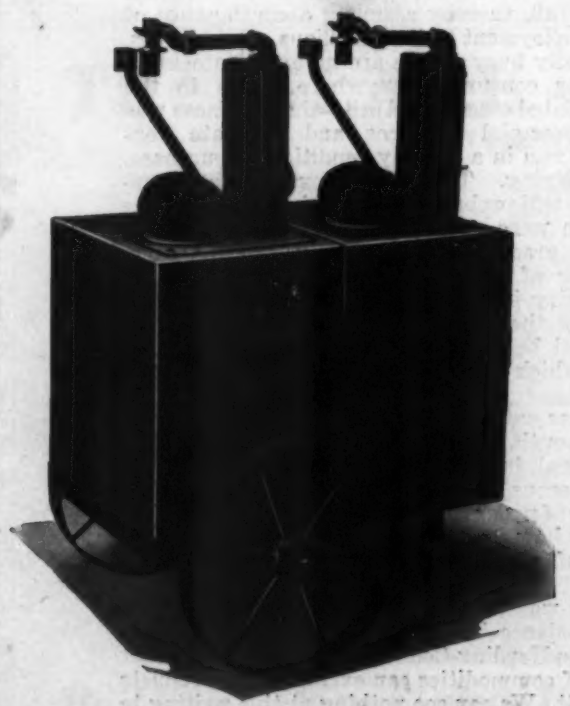
Bowser Increases Production Lowers Lubrication Cost

In many paper mills, Bowser has lowered production costs and helped increase the output ---yet saved money on oil and on oil handling.

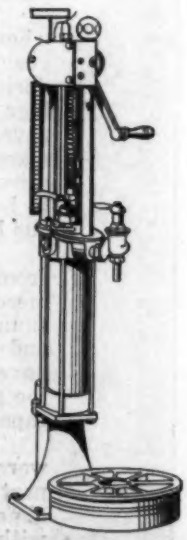
By feeding more oil to the bearings, for instance, those bearings are kept cooler. This more plentiful oil supply has made it economical to use higher grades of oil, with all the resultant effect of better lubrication.

This better lubrication prevents shut-downs, largely eliminates burned-out bearings, and insures longer life to the machinery.

Bowser oil storage and distributing systems also save money, and eliminate fire hazards. The oil is stored in leak-proof tanks. Waste is eliminated because the oil is accurately measured out. Incoming oil drums and barrels are drained dry--- no waste there, either. With a portable unit, as illustrated, oil is taken to where it is to be used---thereby eliminating the wastage and danger of slippage and accident that follows carrying oil in small measures



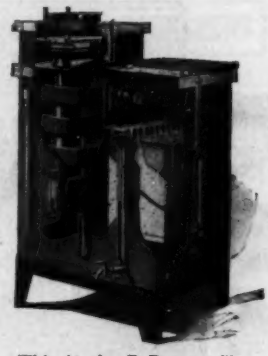
This is a picture of two Bowser tanks mounted for easy handling—giving two grades of oil wherever they are needed.



This is Pump 115 —the standard self-measuring pump all over the world.

from storage tank to machine.

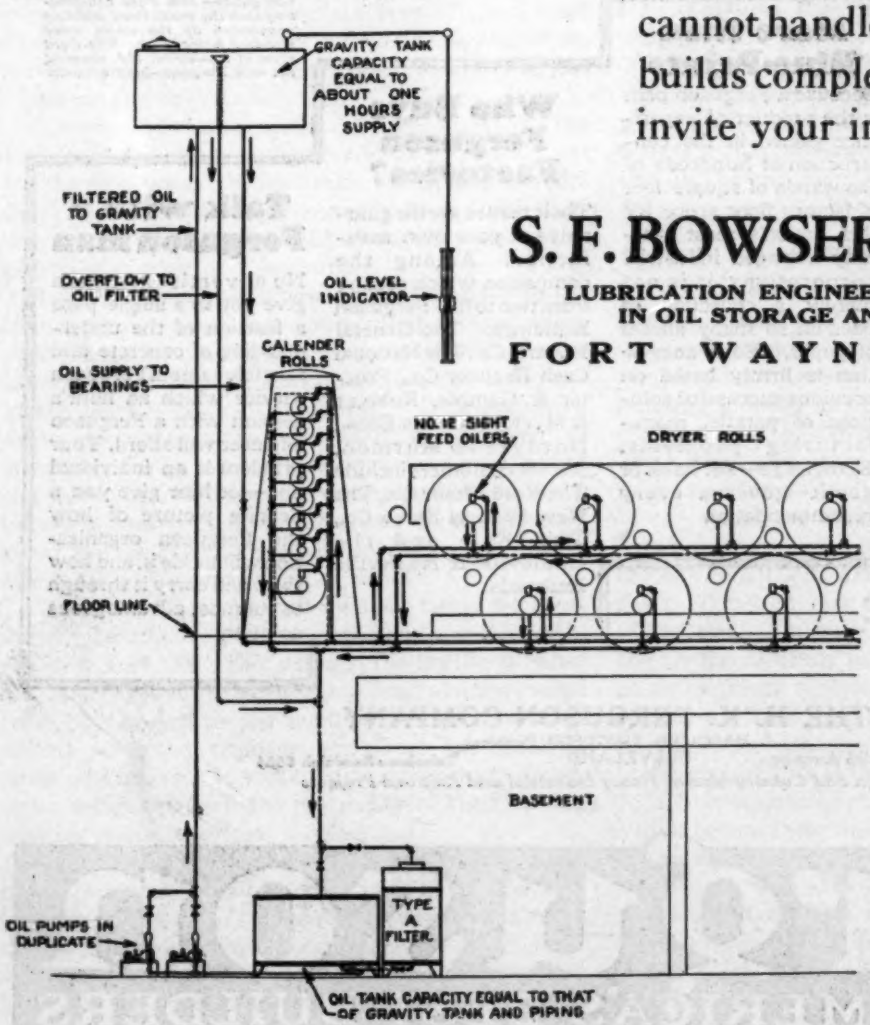
Then, there is the great saving in oil and machinery that is brought about by Bowser power-plant installations. The Bowser-Richardson-Phenix continuous by-pass system for steam turbines is guaranteed to eliminate sludge, both soluble and insoluble, and prevents acidity and emulsification.



This is the R-P type filter already used in so many paper mills.

R-P lubricators, already used on all types of prime movers, assure adequate lubrication at all times. Thus, there is no paper mill lubrication or oil-storage problem that Bowser cannot handle, and Bowser alone builds complete equipment. We invite your inquiries.

This outline shows how full stream lubrication of continuously purified oil is delivered to every bearing of dryer and calender rolls by our Richardson-Phenix system.


GRAVITY TANK CAPACITY EQUAL TO ABOUT ONE HOURS SUPPLY
FILTERED OIL TO GRAVITY TANK
OVERFLOW TO OIL FILTER
OIL LEVEL INDICATOR
CALENDER ROLLS
OIL SUPPLY TO BEARINGS
NO. 1E SIGHT FEED OILERS
DRYER ROLLS
FLOOR LINE
BASEMENT
TYPE A FILTER
OIL PUMPS IN DUPLICATE
OIL TANK CAPACITY EQUAL TO THAT OF GRAVITY TANK AND PIPING

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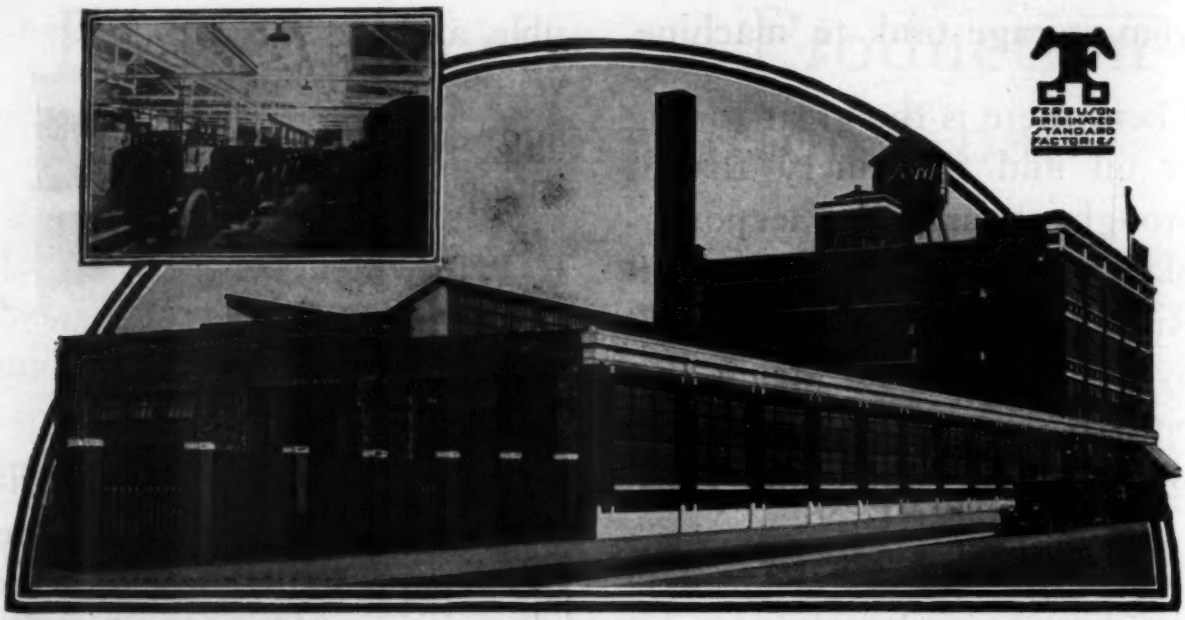

Marking a transition in construction policy—new Ford construction sees the multi-story building supplanted by the single story standard factory type. The Ford plant at Louisville, Ky. showing the new Ferguson-built addition.

Straight-Line Thinking

Think in a straight line—plan in a straight line—these are fundamental planks in Ferguson policy. As a result a Ferguson factory is itself a very definite production tool because it enables production to proceed smoothly with least time-loss. Material-handling is reduced to a minimum. Back-routing is eliminated.

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Because a Ferguson plan is the product of experience gained in the construction of hundreds of thousands of square feet of factory floor space for this nation's most carefully managed industrial corporations, it is not merely a collection of lines on so many sheets of paper. Each suggestion is firmly based on previous successful solutions of parallel manufacturing problems. Knowledge—not habit or guess—governs every recommendation

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No advertisement can give you in a single page a fraction of the understanding of concrete and tangible value of Ferguson service which an hour's session with a Ferguson engineer will afford. Your problem is an individual one—let him give you a definite picture of how the Ferguson organization will tackle it, and how they will carry it through to its most advantageous solution.

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EDITORIALS

The Canadian Embargo

SINCE the action of the Canadian Government on June 26th, by which the Governor-in-Council is permitted to impose an embargo on the exportation of pulpwood from privately-owned timberlands whenever he sees fit, there has probably been more excitement caused, hasty protests made and comments published than has resulted from any previous legislation enacted by either the Dominion or American Governments which directly affects their respective interests.

Soon after the action of the Dominion Government had been made known, a letter of protest was framed and sent to Secretary of State Hughes by the American Paper and Pulp Association and endorsed by the National Publishers' Association, setting forth the fact that since 1910, when the rights in certain Crown Land leases had been arbitrarily taken from the paper manufacturers of the United States, the American paper manufacturers have depended for an auxiliary supply of pulpwood from the Canadian freehold lands.

The annual consumption of pulpwood in the United States is approximately 6,000,000 cords, and for the past ten or twelve years, one million or more cords have been imported annually from these freehold lands, which has served to regulate the entire pulpwood market of this country.

If this million cords a year should be added to the annual drain on our fast diminishing forests, there would be an increasing rise in the cost of pulpwood toward wartime levels, and its consequent reflection in the market price of newsprint. It is estimated conservatively that the latter would be advanced ten dollars or more a ton over present prices, or an added charge of $25,000,000 a year on the publishers of the United States for newsprint alone, to say nothing about the tremendous increase in the cost of magazine, book and other grades of paper.

The pulp and paper mills which would be most directly affected by the embargo are those of northern New York, New England and the northern Lakes States. These mills for many years have purchased from twenty-five to one hundred per cent of their annual pulpwood requirements from the freehold lands of Canada. It would force upon them an extreme hardship, even the possibility of their having to cease manufacturing.

With the rapid growth staged by Canada in the production of newsprint, which in 1913 was 350,000 tons and bids fair to exceed 1,300,000 in the current year, it is easy to understand that one of her prime motives for the embargo is "self-preservation." Fire and the production of wood pulp are cutting deep inroads in her forest wealth. The one million cords of pulpwood which are now being shipped annually to the States from freehold lands are regarded as necessary for the supply of her constantly increasing production facilities. New machines are being added and new mills are being built, and Canada feels that it is her duty and right to conserve her natural resources.

On the other hand, it must be remembered that Canada owes much to the United States for having been particularly helpful in financing the industry through which she now threatens to cripple us. Millions of American dollars have been sent into Canada to finance her paper industry, and fair prices have been paid for all pulpwood we have imported.

Before confiscating to their own purposes those rights we have had in her freehold lands, caution should be exercised that an unjust trade restriction is not committed, which might bring about retaliatory measures and create barriers in the path of trade.

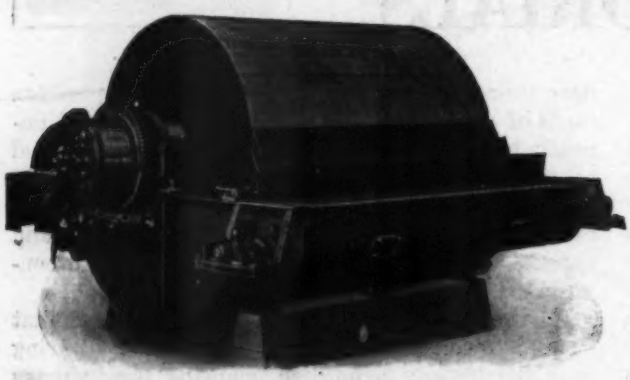
It is gratifying to know that the Canadian Government has agreed not to apply the embargo until a committee shall have given the United States' interests a full hearing on the subject, and we believe that in the end sound reason will prevail.

Have a Heart

IT IS hot. Even in your shaded office, Mr. Manager or President of most any paper or pulp mill, with open windows and humming fan, you can hardly compel your interest in your work to overcome the lethargy induced by physical discomfort.

If you want to cool off, take a stroll out in the machine room and stand near the big machine, with steam pouring off the heated dryers, or in the rotary room, or digester room, or down in the boiler room, which may be down under the ground. There are no desk fans there, and in some places no open windows. But your men have to work in the places all of the time. And they have to keep going and watch their work carefully in order that your business may go on in safety without shutdown or impairment of efficiency. They can not take a day off when the heat gets unbearable—it must not get unbearable for them, for this is their work. The most they can do is to occasionally steal to a corner where there is a little breeze from the outside, and brace themselves for another turn.

It is true that men must work in hot and uncomfortable surroundings in the summer, if this industry is to go on, but have you done everything you can to relieve the discomfort as much as possible? Have you given the same intelligent study to venti-



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Thilmany Pulp & Paper Co.
West Virginia Pulp & Paper Co.
Brown Company
Brown Corp.
Champion Fibre Co.
Ford Motor Co.
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Olivers are unequaled for efficiency and economy of operation in each of these four processes:

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EDITORIALS

lation of the different departments of the mill that you would if you had to spend a considerable portion of your time there? Proper use of ventilating fans would be very helpful in many places in the mill.

Do you provide plenty of cold, healthy drinking water, and proper bathing facilities? You know how you like the cold shower when you are hot, perspiring and tired from a round of golf.

If you are doing these things, or if not and will do them, then your men will rise up and call you blessed, and this is worth more than a few extra dollars. At the same time, you will have the pick of labor, and you will have more and better work for the same money, besides the satisfaction of having made life more bearable for those whose welfare has been placed in your hands.

Thorough covering of heated pipes, for instance, will not only make conditions better in the mill, but will soon save enough coal to pay for the expense.

Proper ventilation of the machine room, or vapor absorption systems on the machines are not added expense, but are means by which a better profit can be made, and this applies to many other places in the mill.

Think it over.

What Is the Real Cause?

ON A number of occasions, it has been pointed out to us that the present-day paper machine clothing, and particularly wires, does not give the same length of service that was secured a few years back, and we have been asked the reason for this. The question is too deep for us, or anyone else, to answer off hand.

If we look at the present-day wires, we will find that they are not only manufactured from a better material than those of years ago, but are made on better machinery, and are much more perfect in every respect. Then, someone asks, why do wires last only days now when they used to last weeks and months a few years ago?

The writer once heard a story of a paper manufacturer who had a paper mill in Pennsylvania fifty years ago, and one day made his appearance in the plant of a wire manufacturer in New Jersey, and made a great kick because the last wire he bought of this company had only run a little over five months. If a paper manufacturer could buy a wire today that would run for five months, he would pay almost any price for it.

But what is the cause? Is it on account of the fast running of present-day machines? Is it the strong suction on the machines of today? Is it caused by certain classes of poor fibre, or by gritty clay, or a number of other agencies, or is it caused by all of these things and others combined with them?

Possibly now that the good old summertime is here with us, and everyone is trying to divorce himself from the frenzied routine of the mill, and while we long for the seclusion of peaceful valleys, cool, sparkling lakes, or widening lanes up the mountain sides, where we can again see the rushing streams, whirling and churning over jagged rocks, and be boys for a few days; and while we would like to consign to oblivion everything that smacks of the mill for the nonce, and hie our weary bones and tired domes to some of the restful places of nature, and drink in the pure air that is not filled with the smell of the mill, and claim freedom for at least a few days, with all our worries relegated to some dark abyss; and, like one of our old friends, who, when asked how he spent his time, seemingly having nothing to do, replied that sometimes "I jest sits and thinks, and sometimes I jest sits," it might be well to take along a few of these problems, so that if perchance we should happen to "sit and think," we might be able to figure out where the trouble is.

One wire manufacturer has suggested to us that he thought the solution could best be found through the technical men of the mills and the technical men of the wire manufacturing companies getting together and making a close study of the whole subject to find out, if possible, a remedy.

This publication would be pleased to receive suggestions for improvement in this matter.

New Series on Costs

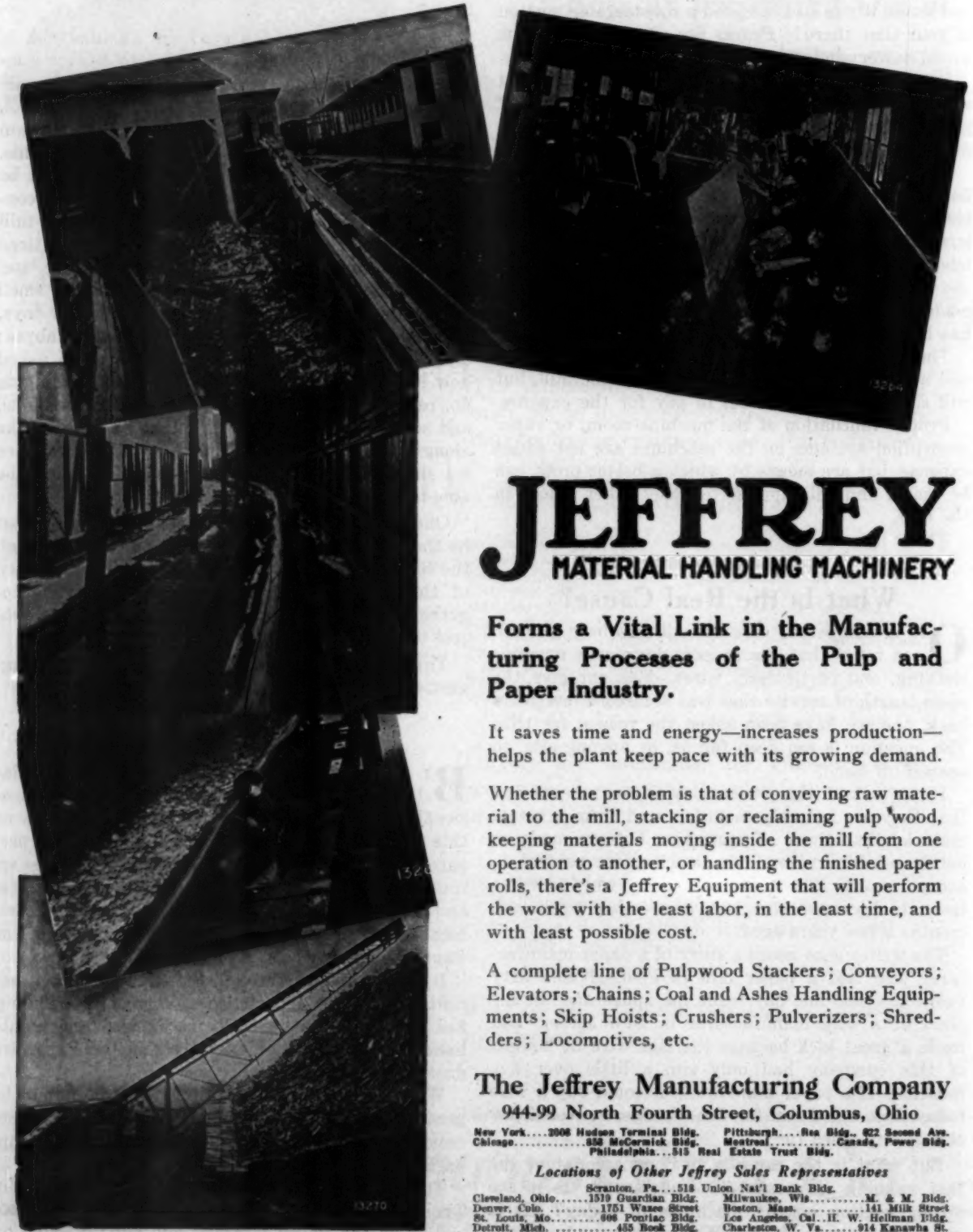
BY A special arrangement with the Cost Association of the Paper Industry, a series of educational articles will appear in forthcoming issues of this magazine. These articles will be specially prepared by men who are practical and successful cost accountants in the Paper Industry, and will describe and exhibit methods and ideas which are recommended and practiced by the Cost Association of the Paper Industry.

It is only of late, through the efforts of the Association, that the importance of correct cost finding has become more generally recognized and established in the minds of executives in the Paper Industry.

With big problems of competition in hand the necessity for reducing manufacturing costs to successfully help in solving this situation is very apparent.

The first article in this series has been written by Thomas J. Burke, C. A., secretary of the Cost Association of the Paper Industry and will be found on another page in this issue.

Chains for Every Service



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THE PAPER INDUSTRY

REG. U. S. PAT. OFF.

Vol. 5 AUGUST, 1923 No. 5

Wages, Timekeeping and Payroll

By H. M. GRASSELT

WAGES constitute a very large percentage of the cost of production and rates, timekeeping and making-up of the payroll require, therefore, the application of modern, efficacious methods. The control and effective regulation of the cost of labor is, in fact, an integral part of production control for the purpose of eliminating inefficiencies and excessive expenditures along the line. Here, like in other phases of manufacturing, waste must be checked promptly and the cost kept down to a minimum without impairing the functions and effectiveness of the organization.

To obtain the end in view, necessitates an adequate timekeeping system and a serviceable payroll. A proficient method in timekeeping and checking of time means to the management prevention of wasting valuable time, elimination of opportunities and temptations to be dishonest and dependable records and statistics of labor distribution and costs.

Rather crude methods of timekeeping were in evidence until not so many years ago, and even today there still exist mills which neglect to attach appropriate importance to the subject. In many cases, foremen make out the time for their respective departments, that is, they enter their employees' time into a book or list, often not until that record is required by the paymaster for the compilation of the payroll. That such entries, often made from memory and without means of checking them, give rise to frequent errors, is quite logical. Quite true, the average man is honest and has no inclinations of getting something for nothing, but it is just human, that an overpayment may not be reported, it may be forgotten or the recipient may not even figure out the amount due him. On the other hand, shortages in pay lead to aggravating altercations and dissatisfaction. Hence, why take chances? Why not protect both, the employe and the employer, equally against losses by the installation of a system which will eliminate, or at least reduce to a minimum, all possibilities of mistakes, losses and arguments?

Wages

Wages in the paper industry, like elsewhere, are based upon economic conditions and the law of supply and demand and usually determined between employees' unions and employers for a definite period, of time, in accordance with industrial prosperity. The methods of payment must be based on certain fundamentals, besides those of supply and demand, which will give the wage earner the highest return for his efforts under conditions resulting in a correlating high quality and quantity of production.

Wages may be classified as (1) day wages, (2) piece work rates and (3) bonus or premium systems. Day wages are, of course, predominating throughout the paper industry, but the last two methods of payment also prevail to a certain extent.

Day Wages

Here the question arises "What constitutes a fair day wage and what amount of a particular class of work must be done to represent an adequate return for it?" As already stated, wages are evolved by living conditions, supply and demand and similar economical subjects. Hard times will bring low wages, while prosperity usually creates inflations. The basic aim of the day rate is to reward the worker in proportion to the amount and quality of work he does and the skill required to do a certain class of work. Consequently, those doing the most work or the more difficult tasks, should receive the highest rates. However, this is not always so. The rules of organized labor demand that all men performing similar work shall be paid the rate determined for that specific class of work. As men are not equally skillful or industrious, certain inequalities are the logical result of this method. This and several other factors lead to the introduction of piece work rates, in order to offer an incentive for greater efforts and to reward the more proficient wage earner.

Piece Work Rates

The principles laid down by Taylor, Emerson, Halsey and a few others of the foremost originators and

exponents of piece work rates and bonus systems, are still as effective today as they were at the time of their inception. Their piece rate plans contemplate payment of a certain wage for a certain unit of production as a tangible reward for increased efforts, sufficient to interest the worker and representing a material recompense for greater accomplishments.

Piece work are usually based on day work rates. To establish a fair piece work rate requires, therefore, a thorough knowledge of the amount of a particular unit representing a fair day's work. Furthermore, to be effective, the rate must be established conforming to certain fundamentals, that is, a profound understanding of the nature of the work, time study and a careful investigation into and consultation of previous records. A stop watch alone won't do; the person entrusted with the installation of piece rates really must understand the work and the factors that govern it.

Sheet No. .....

Labor Distribution

..... **Department**

for 1923

Clock Number	Classification	Hours				Total Hours

..... Foreman.

Fig. 1—Daily Labor Distribution Sheet

It is imperative to establish the right piece rate at the beginning; to cut rates when the worker's earning increases proportionately to his increased efforts, is poor practice and leads to discontent and even refusal to work at piece rates. Of course, piece work rates have to be adjusted analogous to day rates to meet changing economical conditions. To allow piece rates to remain at their old level when day wages are raised, would hardly be accepted by the piece rate workers. If day rates have to be reduced, piece rates naturally will have to follow the downward course. To act otherwise in either case would be unfair to both classes of employees as well as to the employer, as the latter alone would have to carry the burden created by the differential.

In paper mills piece work rates may be applied to several classes of work conformably to the grade of paper manufactured. In fine mills, for instance, trimming, counting and various other finishing room routine jobs may be done profitably at piece work rates. Plating and sheet pasting should, under any circumstance, be done at piece work rates.

Experience has shown that piece work rates for certain classes of work at their inception created a tendency of depreciating the quality of the work for the sake of larger production and resultant greater individual earnings. However, a fair method of inspection soon eliminated all inclinations toward slipshod work. Usually piece rate workers take pride in turning out a good piece of work up to standard and requirements in every respect, instead of taking a chance of having their work rejected and probably deducted from their wages. At any rate work done at piece work rates will not require more inspection or supervision than that produced under day rates and surely not necessitate additional expenses for inspectors.

The Bonus or Premium System

Bonus or premium may be termed a reward based upon the skill and efficiency of the worker. The system is founded on wages paid for standard time and may be applied throughout the plant or only to certain classes of work. The installation requires a good deal of meditation and investigation in order to be just and adequate. Today bonus or premium systems are seemingly less in use than a few years ago.

The profit-sharing plan may be classified under the bonus and premium system, although it is not exactly a reward for greater efforts and efficiency. It rather acts toward keeping employees in their positions and thus reducing the cost of labor turn-over. Hence, profit sharing may be called a reward for loyalty and an incentive to take a continuous interest in the job and the welfare of the enterprise.

Timekeeping

To effectively handle the problem of adequate timekeeping requires the application of modern methods. The time-honored timebook is still used in many mills, especially in smaller ones. Another method is the brass check system, that is, each employee is given a check with a number. In entering the building the man is required to hand the check to the timekeeper, who places it on a board with corresponding numbers and on leaving the employee has to take his check. Some plants reverse the procedure; here the timekeeper will hand the check to the employee when the latter enters the plant. Hinged boards with

locks are put up in the various departments, whereon the employee will hang his check. These boards are locked shortly after starting time and opened again at the closing periods. Employees will then take their respective checks and hand them into the timekeeper's office on their way out.

Today a great many plants have time clocks or mechanical time recorders, which eliminate trusting the memory of accuracy of timekeepers or other persons. The procedure of recording time by these devices is known so well as to require no minute

Sheet No.....

Payroll No. .....

Week Ending ..... 192....

Clock No.	Names	Rate	Regular Hours	Sub Total	Over-Time	Sub Total	Wages Total	Grand Total
.....	BD—Rag Room.....	.....	.....	.....	.....	.....	.....	.....
.....	WD—Washers	.....	.....	.....	.....	.....	.....	.....
.....	PD—Pulper	.....	.....	.....	.....	.....	.....	.....
.....	Total Half Stuff Labor	.....	.....	.....	.....	.....	.....	.....
.....	BD—Beaters	.....	.....	.....	.....	.....	.....	.....
.....	PM—Gen. Paper Mach.	.....	.....	.....	.....	.....	.....	.....
.....	PM1—Paper Machine No. 1	.....	.....	.....	.....	.....	.....	.....
.....	PM2—Paper Machine No. 2	.....	.....	.....	.....	.....	.....	.....

Figure 2——First sheet of Payroll. Enumeration of all departments accordingly, with sufficient space for the entry of the individual members of each department

description. Necessary is, of course, that the individual employee is provided with a time card and assigned a clock number. The time cards are to be sufficiently large to permit the registration of the workman's time for an entire week or pay period. Aside from that individual time card, the foreman of each department is required to make out a Daily Labor Distribution Sheet (Figure 1) and pass it at closing time to the timekeeper as a means of checking the workman's individual time card.

The labor distribution sheet also serves to expedite labor classification for cost work.

The Payroll

Time records, no matter in what form they are kept, must be assembled into the payroll. Under the timebook system it meant copying of figures previously entered into the payroll. The use of time clocks with individual workman's time cards eliminates this duplication of work. The timekeeper merely adds the hours worked by the man and registered on the individual time card and enters the total hours into the payroll sheets under the particular classification, the individual time card having been checked daily against the foreman's distribution sheet for the purpose of finding and adjusting any possible discrepancies before making up the payroll.

The payroll must be properly constructed to meet the requirement of the particular business. It should present the labor cost statistics accurately and in a concise form and be divided in such a manner as to facilitate their availableness for the cost accountant.

To make the payroll link up with the cost work it is divided into various divisions, each representing a certain department or unit. (See Figure 2.) Many mills carry the division even farther by adding captions for the individual classes of work and columns for the distribution of direct and indirect labor. In this case departments or units must be given symbols or numbers. Paper machine-room labor, for instance, will thus be distributed as follows:

PM—Gen. Paper Machine

PM—1 Foreman.
PM—2 Spare Hand.

PM1—Paper Machine No. 1

PM1—1 Machine Tenders.
PM1—2 Back Tenders.
PM1—3 Roll Boys.

PM2—Paper Machine No. 2

PM2—1 Machine Tenders and so on, as stated under Machine No. 1, or departments may be given numbers and letters may be used for subdivision.

The foremen, of course, have to use the very same symbols in making out their daily labor distribution sheets. However, to carry the division of the payroll to such an extent requires a great deal of work. For the average plant and average cost system a payroll divided into departments similar to the inserted specimen will cover all requirements and serve its purpose.

Many plants show "Split Pay" whenever the end and beginning, respectively, of a month fall within a pay period or week in order to have the labor cost for a full month. Others again divide their fiscal year into thirteen even periods for the payroll and cost records.

In making up the payroll it would mean waste of time to copy the workers' hours day by day in columns provided for that purpose. Having a complete record on the workman's individual time card the paymaster merely has to enter the total hours of the individual employee. The time cards, after having been properly checked against the payroll entries, are then bundled up in consecutive order and filed away. A tag or label attached to the bundles, showing the pay period, will facilitate locating them when required.

In mills without addressing machines to facilitate making out of pay envelopes and pay receipts, envelopes with a detachable receipt may be used to advantage, as they permit the insertion of carbon paper for the purpose of writing both the envelope and the receipt in one operation.

An effective timekeeping system and a well-arranged payroll do not mean additional expenses; to the contrary, they will save money, add to the plant discipline and facilitate the distribution of labor costs for cost accounting purposes.

The Effect of Concentration in Bleaching Soda Fiber

By E. SUTERMEISTER

THERE has been of late a very decided tendency toward higher concentrations of fiber in bleaching operations, and a number of different types of apparatus have been developed to handle stock at considerably greater concentrations than have been used in the past. The old types of tank or vat bleachers generally operate at about 2 to 3 per cent concentration of fiber, while Bellmers and those of similar construction can be operated at 6 to 7 per cent. The new apparatus, however, is designed to work at fiber concentrations of 12 per cent to as high as 25 per cent or even more.

The claims made are that bleaching at high concentrations saves a large amount of the heat ordinarily required, reduces the shrinkage or loss on bleaching, saves a very appreciable proportion of the bleach necessary at lower densities and very greatly reduces the time necessary for the production of a good, white color. Another advantage is said to be the superior cleanliness of the fiber, the greater concentration of the bleach acting very favorably in the reduction of the shives and dirt. It has been said that these advantages are not gained to any appreciable extent below 12 per cent concentration, but that above that point they show up strongly.

Most of the work relating to high concentration bleaching has been performed on sulphite fiber, and so far as can be proved by large scale operations, most of the claims made appear to be justified. As practically no tests had been made with soda fiber, and as it was desired to see if some of the advantages could not be obtained at concentration of less than 12 per cent, it was thought best to carry out a series of tests with soda poplar fiber. Three different lots of fiber were used in the tests, all having been prepared from poplar with a small proportion of hard wood. The first had been washed, screened and run over the sand settlers as usual; the other two were also the regular screened product, but to each a large quantity of shives was added. These were obtained by taking some of the screenings removed by the centrifugal screens and rescreening them on a small hand screen. The fine shives which passed through this small screen were added to the good fiber in sufficient quantity so that the resulting stock was very shivey. Each lot of stock was very thoroughly mixed and made into sheets which were then air dried. When they were at equilibrium with the air surrounding them, samples for bleaching were weighed out and also a sample for moisture so that all results could be based on fiber containing 10 per cent of moisture, or so-called air-dry fiber.

Bleaching tests on each lot of fiber were started by determining the per cent of bleach required to give a certain standard color when the bleaching was carried out at 35 degrees C. and the concentration was 2 per cent of air-dry fiber at the start of the test. Other bleachings were then made at concentrations of 4, 8 and 12 per cent. In each of the tests, the volume of bleach solution added was considered the equivalent of an equal volume of water in calculating the concentration. The method of bleaching was to add the bleach solution to the fiber, which had previously been broken up to a pulp in the necessary amount of water and heated to the desired temperature. The action was then allowed to proceed with continual agitation until the addition of starch iodide gave a faint blue only after a minute or two. At each concentration the determination made included the time in hours required to exhaust the bleach; the percentage loss in weight on bleaching which was caused by the chemical action of the bleach; the color of the bleached fiber expressed relatively; and the number of shives per 100 grams of bleached fiber.

All tests at 2 to 12 per cent inclusive were made in glass battery jars with hard rubber agitators. A few at 18 and 24 per cent concentration were made in a specially constructed apparatus made of brass. When bleaching in this apparatus, the brass was somewhat affected by the bleach solution and the fiber had a slight greenish tone due to the presence of copper. To remove this it was necessary to treat the bleached fiber with acid after the bleach residues had been washed out, and as an acid treatment toward the end of the bleaching operation is known to give a little better color than a full alkaline treatment, there is some little doubt as to the propriety of comparing the colors of pulps bleached in the two types of apparatus. The comparisons are given, however, for what they are worth, but it must be remembered that the colors of samples bleached at 18 and 24 per cent concentration are probably better than they would be if they had been bleached in glass and not treated with acid.

Thermostatic temperature control could not well be applied to the equipment used, and as the temperature of the bleach bath depended somewhat on the outside temperature, some of the tests went wrong because of inability to judge accurately of weather changes. In some tests, also, inconcordant

results for color or loss on bleaching were obtained without any obvious reason. All tests, however, have been included in the following tables which show the conditions under which the bleachings were carried out as well as the results obtained.

Sample No. 1—Collected Jan. 22, requires 11.0 per cent bleach to give standard color.

Sample No. 2—Collected Mar. 21, requires 9.5 per cent to give standard color.

Sample No. 3—Collected May 9, requires 9.3 per cent bleach to give standard color.

SAMPLE No. 1

Density, Air Dry Fiber Percent	Bleach Added Percent	Temperature Degrees C	Hours to Exhaust Bleach	Loss on Bleaching	Shives per 100 gms. fiber	Color
2	11.0	35	20¼	....	7	Standard
2	11.0	35	22	2.33	..	
4	11.0	35	12	....	7	Considerably below 2 per cent concentration
4	11.0	35	12	2.01	..	
8	11.0	35	7¾	....	3	Considerably below 4% concentration
8	11.0	35	5½	2.01	..	
12	11.0	30	4¾	....	..	Much below 8% conc.
12	11.0	35	3½	....	9	Same as 4% conc.
12	11.0	35	3½	1.59	..	
24	11.0	32½–33½	¾	....	..	Somewhat below 12% conc. at 30° C

SAMPLE No. 2

Density, Air Dry Fiber Percent	Bleach Added Percent	Temperature Degrees C.	Hours to Exhaust Bleach	Loss on Bleaching Percent	Shives per 100 Gms. Fiber	Color
2	9.5	33-42	21	....	..	Standard
2	9.5	32-38	..	0.84	..	
2	9.5	32-48	..	....	209	Standard
2	9.5	35	22¾	....	231	Standard
2	9.5	35	21¾	0.82	..	
2	9.5	33½-36	21½	....	..	Standard
4	9.5	33-39	13½	1.66	..	
4	9.5	35	14¼	....	158	Standard
4	9.5	35-36	14½	1.14	..	
4	9.5	33½-36	13¼	....	..	Slightly below 2% concentration
8	9.5	35	7	....	71	Standard
8	9.5	35	6¾	0.92	..	
8	9.5	35	6¾	....	..	Slightly below last 4% concentration
12	9.5	35	4⅝	....	59	Below standard
12	9.5	35	4⅝	0.82	..	
12	9.5	35	4½	....	..	Slightly below last 8% concentration
12	10.1	35	4¾	....	..	Standard
18	9.5	31½-33	17/12	....	..	About the same as 12% concentration
24	9.5	33-35	1¹/₆	....	..	Below 12 and 18% concentration

SAMPLE No. 3

Density, Air Dry Fiber Percent	Bleach Added Percent	Temperature Degrees C.	Hours to Exhaust Bleach	Loss on Bleaching Percent	Shives per 100 Gms. Fiber	Color
2	9.3	35	21½	....	1094	Practically standard
2	9.3	35	22	0.86	..	
4	9.3	35	13½	....	638	Very slightly above 2% concentration
4	9.3	35-37	12	1.15	..	
4	9.3	33-36½	12¼	....	..	Considerably below 2% concentration
8	9.3	35	6½	....	394	A little below last 4% concentration
8	9.3	35	6½	1.57	..	
8	9.3	35	6⅝	0.88	..	
12	9.3	35	4¼	....	186	Very slightly below 8% concentration
12	9.3	35	4¼	....	..	Very slightly below 8% concentration
12	9.3	35	4¼	0.88	..	
12	9.3	35	4½	....	..	Practically standard
18	9.3	30-32	31/12	....	..	Below 12% conc.
24	9.3	33½-37	⅝	....	..	A little better than 18% but not so good as 12% conc.

Time Required for Bleaching

Considering the nature of the reaction involved and the difficulty in obtaining exact control in the apparatus used, the check determinations on the time required to exhaust the bleach give remarkably concordant results. These are shown graphically in Chart 1 where the time in hours is plotted against the concentration of the stock. The figures for hours used in preparing these curves, are the averages of all determinations at each density, except in the case of sample 1 at 8 per cent concentration, where the figure for 7¾ hours was so obviously in error that it was not included.

The curves for samples 2 and 3 show a break between 12 and 18 per cent concentration, the time at 18 per cent being less than would be expected from the form of the curve between 2 and 12 per cent. With sample 1 no bleaching was made at 18 per cent concentration, and the curve is much more nearly what would be expected. It seems probable that this irregularity in the curves is caused by the difference in the types of apparatus used, and that if the same equipment could be used at all concentrations, the form of curve would approach that of sample 1 very closely.

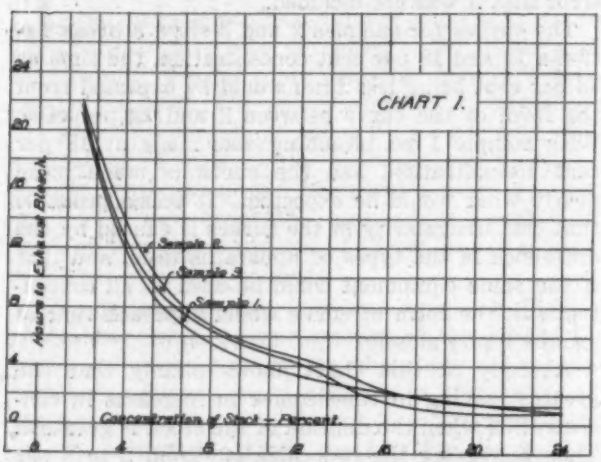
A study of this chart shows plainly that the greatest saving in time comes in increases in concentration when the dilution of the stock is greatest. Thus increasing the concentration from 2 to 8 per cent reduces the time by 15½ hours, while a further increase from 8 to 12 per cent cuts off only about 2 hours more, and indications are that bringing the concentration from 12 to 24 per cent would shorten the time of bleaching by not over 3 hours more. While the power factor could not be taken into consideration in these small scale tests, it will quite likely be found that the increase in power required will set an economic limit to the reduction in time of bleaching which can be brought about by increasing the concentration.

From a single test on sample 1, it appears that when bleaching at 12 per cent concentration a decrease in temperature from 35 degrees to 30 degrees C. (95 degrees to 86 degrees F.) will increase the time required by 1 1/3 hours or from 3 1/3 to 4 2/3 hours. This factor of temperature probably affects the form of the curves for tests at 18 and 24 per cent concentration to a slight extent, for, due to the apparatus used, it was not possible to maintain a temperature of 35 degrees C. in all the tests. Since most of the tests at these concentrations were made at rather less than 35 degrees C., it is evident that the corrected curves would fall still lower on the chart than those shown.

One test on sample 2 and one on sample 3 indicate that at 12 per cent concentration, an increase of 0.6 per cent in the bleach used (based on the weight of air-dry fiber) will increase the time of bleaching by only 15 to 25 minutes.

Bleaching operations on a large scale at 18 to 24 per cent concentration could probably not be completed in as short a time as these small tests because

of the more rapid mixing of the bleach with the fiber and the more violent agitation in the small apparatus. Not enough work on soda fiber has been done to give a very sound basis for comparison, but from one test it appears that the allowance for increased size of charge will not be excessive. In the test referred to 9,000 lbs. of air-dry fiber were bleached at about 26 per cent concentration, between the temperatures of 75 degrees and 95 degrees F., and the bleach



was exhausted in 2 1/3 hours, counting the time from the start of adding the bleach. With such a large volume of stock, the mixing of the bleach with the fiber necessarily required some time, and if it could have been accomplished instantaneously, the bleaching time would have been much nearer that shown on Chart 1.

Color of Bleached Fiber

Since no colorimeter which was capable of detecting and recording numerically such small color differences was available, the best that could be done was to compare the various samples among themselves, using as a standard the sample bleached at 2 per cent concentration and 35 degrees C. Working in this way the following observations were made:

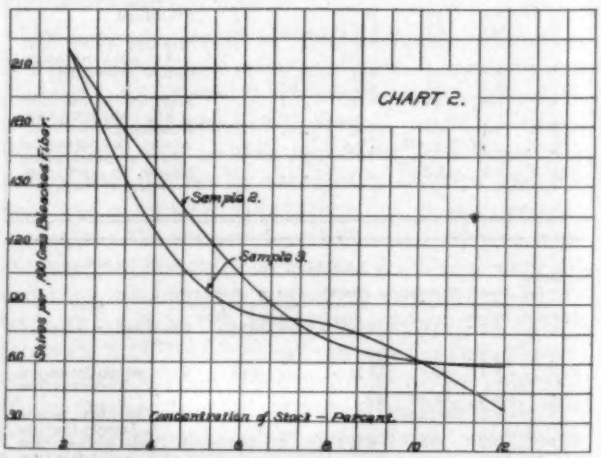
In sample 1, the color grows steadily poorer as the concentration rises, except in the case of the sample bleached at 12 per cent concentration and a temperature of 30 degrees C., which proved to be fully as good as that bleached at 4 per cent concentration. From the results obtained in some of the other bleaches where the temperature varied more or less from the desired point, it hardly seems possible that a difference of 50 degrees C. in bleaching temperature could cause such a difference in color. Lack of fiber unfortunately prevented further tests on this sample, so the point was not settled definitely.

With sample 2, the first series of bleaches gave the standard color at 2, 4 and 8 per cent concentration while that bleached at 12 per cent was below the others. A repetition of this series showed a decrease in whiteness with increasing concentration just as in sample 1, except that the color differences were not quite so great.

Sample 3 shows the same tendency toward a poorer color at higher concentrations except in the case of one bleach made at 4 per cent concentration. This one test was out of line to the extent of giving a very slightly better color than the bleach made at 2 per cent density.

In the case of samples 2 and 3, it was estimated that the difference in color between the 2 per cent and the 12 per cent concentrations amounted to about 0.6 per cent of bleach based on the weight of fiber. As a check on this estimate, rebleachings were made at 12 per cent concentration, using this increased amount of bleach, and in both instances the color of the bleached fiber was found to be the same as that bleached at 2 per cent concentration. Because of lack of fiber, sample 1 could not be checked in this way, but it was estimated, however, that the color difference was considerably greater in this case and that nearly 2 per cent more bleach would be required to bring the color of that bleached at 12 per cent concentration up to standard.

All of the above observations on color relate to the samples which were bleached in glass containers. Those which were bleached at 18 and 24 per cent concentrations gave results which were as a rule a little inferior, even to those which were bleached at 12 per cent, but the comparison is not very reliable because, with the apparatus used, the fiber becomes stained greenish with copper and this has to be removed by treating the bleached fiber with acid. It is known that an acid treatment toward the end of the bleaching operation improves the color of soda fiber, and it is quite possible that the treatment for the removal of the copper stain may have had a similar result. In that case the color of the samples is probably better than it would have been if they had been bleached in an apparatus which caused no stain necessitating an acid treatment.



It seems to have been established beyond any

reasonable doubt that with these three lots of fiber, increasing the concentration causes a poorer color. This holds true at least between 2 and 12 per cent and probably even beyond the latter point.

Loss on Bleaching

The figures for loss on bleaching show certain discrepancies which cannot be entirely accounted for. Quite possibly they arise from the difficulty of handling stock in lots of 100 grams without any loss, and possibly also from the difficulty in washing out the bleach residues completely from such large lots of fiber. From a consideration of the data obtained, the most reliable figures seem to be as follows:

Concentration, per cent	Per cent lost on bleaching. Sample 1	Sample 2	Sample 3
2	2.33	0.83	0.86
4	2.01	1.14	1.15
8	2.01	0.92	0.88
12	1.59	0.82	0.88

It is to be observed that one of the samples shows a decrease in the loss on bleaching as the concentration rises, while the other two show practically no difference between 2 per cent and 12 per cent concentration. Sample 1, which shows the decreased loss on bleaching with increased concentration, is the one which shows the greatest decrease in whiteness with increasing density. This seems an entirely reasonable relationship, for if a low color is produced it will appear that the bleach could not have acted on the cellulose to so great an extent as if a good white color had resulted. Moreover, these two observations fall in line with the loss of volatile matter of an oxidizing nature, which is obviously much greater at higher concentration.

Although all samples were given the same washing treatment with hot water, which was supposed to be sufficient to remove all bleach residues, it is possible that there may have been unnoticed differences which affected the results. As a check on possible errors from this cause, the ash was determined in the bleached fiber in sample 3, which had been bleached at 8 per cent density and washed in the usual way, and also in two samples bleached at 12 per cent concentration and given an unusually prolonged washing with a heavy spray of water. The former was found to contain 1.17 per cent of ash and the two latter 0.68 and 0.76 per cent respectively. Such differences as these might go far toward neutralizing those shown in sample 1.

On the whole, the question of loss on bleaching cannot be considered as answered with absolute certainty, but it seems a safe conclusion that any difference between concentrations of 2 per cent and 12 per cent will be so slight as to be practically without effect on commercial bleaching operations.

Reduction of Shives

The shives remaining after bleaching decrease rapidly as the concentration rises. This holds true for both samples 2 and 3 and is indicated graphically in Chart 2 where the number of shives per 100 grams of bleached fiber is plotted against the concentration. In order to bring the two curves into closer proximity and show their relationship better, the actual number of shives in sample 3 has been divided by 5. The figures for sample 1 are not included in this chart because the number of shives was so small as to make the results unreliable.

Conclusions

From this series of investigations, it is concluded that with soda fiber, increasing the concentration of the stock during bleaching lowers the color of the bleached fiber. This change is of such small magnitude that it can be corrected at very slight cost by the addition of a little more bleach.

If the concentration of the stock is raised to 8 per cent, much the greater part of the saving in time and in the reduction in shives will be gained, while increasing the concentration beyond this point accomplishes comparatively little.

The loss on bleaching is so slightly affected by concentration that it need not be taken into consideration.

The Pay Envelope

By EDGAR A. GUEST

Is it all in the envelope holding your pay?
Is that all you're working for day by day?
Are you getting no more from your toil than the gold
That little enclosure of paper will hold?
Is that all you're after, is that all you seek?
Does that close the deal at the end of the week?

Is it all in the envelope holding his pay?
Is that all you offer him day after day?
Is that all he wins by his labor from you?
Is that the reward for the best he can do?
Would you say of your men, when the week has turned,
That all they've received is the money they've earned?

Is it all in the envelope, workman and chief?
Then loyalty's days must be fleeting and brief;
If you measure your work by its value in gold
The sum of your worth by your pay shall be told;
And if something of friendship your men do not find
Outside of their envelopes, you're the wrong kind.

If all that you offer is silver and gold,
You haven't a man in your plant you can hold.
If all that you're after each week is your pay,
You are doing your work in a short-sighted way,
For the bigger rewards it is useless to hope
If you never can see past the pay envelope.

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Power Plant Management

What Management Should Know About Coal

By ROBERT JUNE, Associate Member A. S. M. E.

This is the first in a new series of articles by Robert June, the well-known authority on Power Plant Management. The articles are written from the point of view of the managing executive and deal with the dollars and cents end of Power Plant Operations and Maintenance. Succeeding articles deal with such live topics as Efficient Combustion Practice, Safe and Efficient Boiler Operation, Stoker Operation and Maintenance, What Management Should Know About Coal and Ash Handling Equipment, and so forth. The series is timely and should prove of value to our readers.

THE proper selection of coal, the adoption of the right fuel to the right equipment, is a problem, the correct solution of which offers unusual opportunities to effect economies in the operation of the Power Plant. It is a problem which should ever be taken into consideration in the design of a proposed plant.

Classification of Coals

The distinctions between the various ranks of coal are not clearly defined. The most satisfactory method for establishing the various classifications is by the use of both Mechanical and Physical Criteria. On this basis the ranks indicated below are arrived at.

ANTHRACITE. The outstanding characteristics of anthracite is its low volatile content. Because of this it burns with very little flame, giving an intense fire free from smoke. Good anthracite is hard, compact, and lustrous, giving a vitreous fracture when broken. The chemical composition and heat value of anthracite is shown in both Fig. 1 and Table I.

An important source of financial loss in the use of anthracite lies in the fact that no matter how carefully handled, it is liable to break up into very tiny pieces, under the influence of the high temperature of the furnace, when freshly fired, with consequent large losses of fuel through the grates to the ash pit. As anthracite requires at least 40 per cent greater combustion space than does bituminous coal, it should never be purchased for use in furnaces not designed for it.

SEMI-ANTHRACITE. This coal reaches the consumer generally under the name of "anthracite," a deception which should not be tolerated. As the name implies, it is inferior to anthracite. It has less fixed carbon and somewhat more volatile. Its characteristics are likewise given in Fig. 1 and Table I.

SUPER-BITUMINOUS. This grade of fuel is commonly termed "Semi-Bituminous"—an unfortunate appellation as it creates the inference that this coal is inferior to bituminous whereas it is markedly superior.

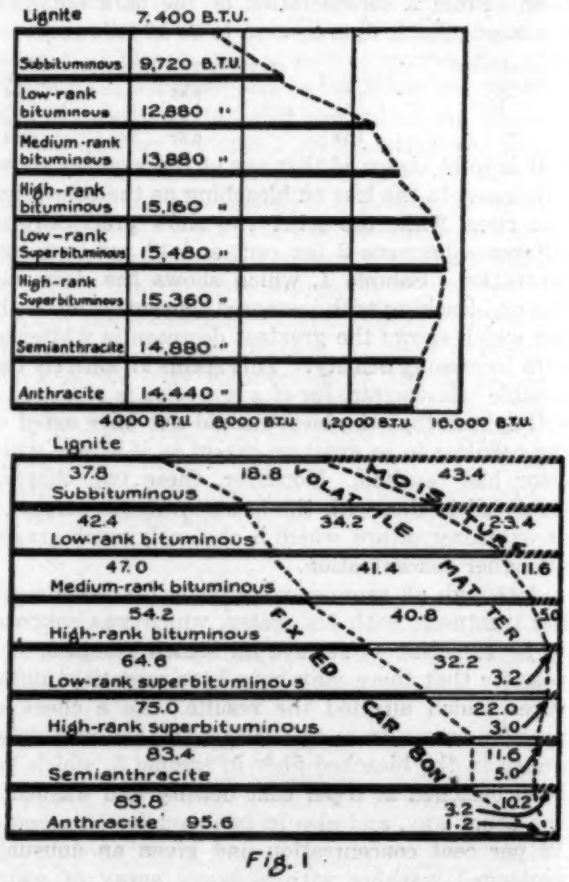


Fig. 1

Comparative heat value, and variations in fixed carbon, volatile and moisture of different coals. Computations on ash free basis.

Another trade name for this fuel is "Smokeless" coal. The latter term is a consequence of the relatively high percentage of fixed carbon which renders the coal practically smokeless when properly burned. The heat value of this fuel is very high and as it requires less bunker and storage space per unit of heat than other coals, it is in great demand for Naval and Steamship use, as well as for manufacturing plants located in crowded quarters where storage space is at a premium and smoke regulations are enforced.

TABLE I

Location and rank of coal	Moisture	Volatile	Fixed Carbon	Ash	Sulphur	Heat Value B. T. U.
ALABAMA						
Lookout Mountain, super bituminous	3.8	19.0	64.4	12.8	1.5	12,980
Birmingham district, bituminous coking	2.4	25.9	66.8	4.9	1.5	14,490
ARIZONA						
Russellville district, semi anthracite	2.1	9.8	78.8	9.3	1.7	13,700
Paris district, super bituminous	2.8	14.7	73.4	9.1	2.8	13,770
CALIFORNIA						
Stone Canyon district, bituminous	7.0	46.7	40.1	6.2	4.2	12,450
Mount Diablo district, sub bituminous	15.0	38.4	34.5	12.1	5.6	9,240
COLORADO						
Denver Field, sub bituminous	18.8	30.5	44.5	6.2	0.3	9,650
Trinidad Field, bituminous	7.8	38.5	44.8	8.9	0.5	11,540
Newcastle Field, bituminous, coking	2.9	33.3	56.7	7.1	0.5	13,720
GEORGIA						
Manlo district, super bituminous	2.9	17.1	72.2	7.8	0.7	14,200
ILLINOIS						
La Salle County, bituminous	13.9	37.3	38.5	10.3	3.4	10,990
Sangamon County, bituminous	14.3	37.2	40.3	8.2	4.3	11,010
Gallatin County, bituminous	3.4	35.2	52.5	8.9	2.9	13,190
INDIANA						
Knox County, bituminous	10.6	38.1	43.0	8.3	3.7	11,750
IOWA						
Monroe County, bituminous	15.8	36.9	37.9	9.4	4.7	12,900
KANSAS						
Crawford County, bituminous	4.9	33.5	52.5	9.1	5.0	12,940
EASTERN KENTUCKY						
Bell County, bituminous	2.8	37.8	56.3	3.1	1.0	14,240
WESTERN KENTUCKY						
Union County, bituminous	3.9	37.1	49.7	9.3	3.5	12,830
MARYLAND						
Georges Creek basin, super bituminous, high rank	0.6	16.6	72.1	10.7	1.3	13,380
Lower Youghiogheny basin, bituminous	2.3	25.5	64.4	7.8	1.1	13,780
MICHIGAN						
Saginaw district, bituminous	11.9	31.5	49.8	16.8	1.2	11,780
MISSOURI						
Barton County, bituminous	5.4	32.1	53.6	8.9	3.6	12,990
MONTANA						
Electric field, bituminous, coking	4.0	22.5	59.3	14.2	0.6	12,760
Milloula field, lignite	24.7	29.3	26.1	19.9	0.9	6,730
NORTH DAKOTA						
Adams County, lignite	32.4	30.9	28.1	8.6	1.5	7,330
OHIO						
Jefferson County, bituminous	4.1	38.5	49.7	7.7	3.7	13,150
Washington County, bituminous	3.4	38.7	49.7	9.6	5.0	12,750
OKLAHOMA						
Haskell County, super bituminous	2.7	21.1	69.9	6.3	0.8	14,100
OREGON						
Eden Ridge field, bituminous	12.6	35.0	37.7	14.7	1.3	10,350
PENNSYLVANIA						
Anthracite region, anthracite	2.8	1.2	88.2	7.8	0.9	13,300
Sullivan County, semi anthracite	3.4	9.3	75.6	11.7	0.8	13,120
Cambria County, super bituminous, high rank	3.3	12.5	77.9	6.3	1.0	14,340
Westmoreland County, bituminous coking	2.7	30.4	57.8	9.1	1.3	13,610
Allegheny County, bituminous	3.7	34.0	56.8	5.5	1.4	13,870
Fayette County, bituminous, coking	2.8	30.0	59.8	7.4	1.2	13,990
TENNESSEE						
Claiborne and Campbell counties, bituminous	3.6	37.3	55.5	3.6	1.1	13,980
TEXAS						
Houston County, lignite	33.5	39.5	16.2	10.8	0.6	7,140
UTAH						
Carbon County, bituminous	4.4	38.2	50.5	6.9	0.8	12,760
VIRGINIA						
Appalachian region:						
Tazewell County, super bituminous	3.8	15.5	77.8	2.9	0.6	14,860
Russell County, bituminous	2.8	34.9	56.5	5.8	0.6	14,150
WASHINGTON						
Whatcom County, anthracite	4.4	7.4	76.0	12.2	1.0	12,590
Black Diamond district, bituminous	6.8	40.0	47.9	5.3	1.4	12,330
WEST VIRGINIA						
Wheeling district, bituminous	4.1	36.6	53.3	6.0	2.1	13,400
Fairmont district, bituminous	2.9	34.5	56.9	5.7	0.7	13,040
Upper Potomac basin, super bituminous, high rank	1.1	17.2	73.8	7.9	1.1	14,490
New River district, semi bituminous, low rank	3.5	32.2	71.9	2.4	0.7	14,690
Montgomery district, bituminous	2.4	35.5	56.7	5.4	1.0	14,160
Pocahontas field, super bituminous, low rank	3.4	22.5	68.8	5.3	0.5	14,370

Super-Bituminous coal possesses one characteristic which the public has been prone to regard as a rather serious disadvantage; that is, the coal is quite friable, readily breaking into small pieces not only during the process of mining, but also in transportation and handling. This apparent disadvantage is not necessarily existent, as the coal can be burned with practically no loss through the grates to the ash pit, when fired with mechanical stokers and grates adapted to the fuel. Reference again is made to Fig. 1 and Table I for outstanding characteristics.

BITUMINOUS. This term is applied to a wide variety of fuels. The classification "bituminous" is based in particular upon the relation of volatile mat-

ter in the coal to fixed carbon, but also and more especially to the factor which distinguishes bituminous coals from those of lower rank. This factor is that true bituminous coal is only slightly affected mechanically by weathering even though it be exposed for a long period of years. This is not true of coals of lower rank, which break up readily under the influence of weather.

Many attempts have been made to divide bituminous coals up into characteristic groups. This is not readily accomplished, but the following classifications tell the power plant operator what he ought to know:

(a) Non-Coking, dry bituminous coals are the best for steaming purposes. They closely approach Super-Bituminous in character, being hard and dense, but inclined to be friable, breaking easily in transportation and handling. They ignite readily, and burn freely with short, clean, bluish flame.

(b) Bituminous Coking Coals, as their name implies, swell up, becoming pasty and fuse together in burning. They have a higher percentage of volatile and less fixed carbon than the free burning non-coking coals. Being rich in Hydro-carbon these coals are particularly adapted to gas making. Certain varieties are commonly sold as "Gas Coal."

(c) Long-Flaming, Bituminous Coals are notable smoke producers. Some varieties coke, others do not, so in using coal of this grade for steam purposes, care should be taken to secure a supply at all times from the same source; otherwise uncertain combustion conditions will prevail and financial loss ensue. As a general proposition this coal is preferable for use under dryers, in cement kilns, and so forth rather than for general steam making purposes. Where choice may be exercised, the non-coking, free burning, bituminous coals of the West Virginia, Pittsburgh and Illinois Districts are to be selected for the production of steam. Again we refer to Fig. 1 and Table I.

SUB-BITUMINOUS. The distinction between this coal and Bituminous lies in the fact that Sub-Bituminous rapidly loses its moisture and consequently "Slacks" to a marked extent when subjected to alternate wetting and drying. As the matters of both size and moisture content are important in buying and shipping coal, there are a number of points to be considered before voluntarily adopting Sub-Bituminous coal for use in the power plant. For one thing, unless slacking is to be permitted, it is almost necessary to ship Sub-Bituminous coal in box cars, thus materially increasing the cost of loading and unloading. Another point is that Sub-Bituminous coal is extremely liable to spontaneous combustion. On the other hand, Sub-Bituminous is a very clean fuel and ignites with little difficulty.

LIGNITE. As used by the Geological Survey the term "Lignite" is restricted to those coals which are distinctly brown in color and either characteristically "woody" or "clay like" in their appearance. Because of their high moisture content which may run up to 30 to 40 per cent, those coals cannot be shipped far as no one wants to pay freight on so much water. Lignites are even more difficult than Sub-Bituminous coals to handle because of their rapid loss of moisture and marked tendency to slack and to spontaneous combustion. For economical steam generation, Lignite should be purchased near the power plant and practically used as rapidly as received.

TABLE II

Analysis of a Typical West Virginia Coal				Heating Value Per Pound	Calculated B. T. U.	B. T. U. by Calorimeter
Moisture 2.01	H	0.22	2.01 water.....	None	.....	
	O	1.79				
Volatile 37.31	H	4.86	5.38 Water.....	None	.....	
	O	4.75	4.36 available H.....	62,000	2,641	
	C	26.65	.....	14,500	3,464	
	N	.23	.....	None	.....	
	S	.79	.....	4,050	32	
Fixed Carbon..... 52.13	C	49.18	.....	14,500	7,131	
	N	1.20	.....	None	.....	
	S	1.75	.....	4,050	71	
Ash 8.55			.....	None	.....	.....
					13,339	13,811

TABLE III

Analysis of a Typical Illinois Coal				Heating Value Per Pound	Calculated B. T. U.	B. T. U. by Calorimeter
Moisture 12.39	H	1.38	12.39 water.....	None	.....	
	O	11.01				
Volatile 36.89	H	4.47	9.01 water.....	None	.....	
	O	8.01	3.47 available H.....	62,000	2,150	
	C	23.19	.....	14,500	3,363	
	N	.10	.....	None	.....	
	S	1.12	.....	4,050	46	
Fixed Carbon..... 41.80	C	38.10	.....	14,500	5,525	
	N	.90	.....	None	.....	
	S	2.80	.....	4,050	113	
Ash 8.92			.....	None	.....	.....
					11,197	11,399

Comparison of Different Ranks

Fig. 1* shows proximate analysis of B.T.U. value of the various ranks of coal. This diagram is best on the properties of actual samples of commercial fuels in each rank. Fairly regular increase in fixed carbon from Lignite to Anthracite will be noted. The rapid increase in the moisture in the lower ranks of coal is of interest as is also the fact that the greatest amount of volatile matter is found in the lower ranks of Bituminous.

The diagram at the right shows the B.T.U. value of the coals on an ash free basis. It will be seen that the best coal for steaming purposes is low rank Super-Bituminous and that Lignite possesses very slight value indeed.

Geographical Distribution of Coal

Representative coals of each section of the United States are shown in Table I which is a compilation of analyses made by the United States Geological Survey and the Bureau of Mines.

Moisture in Coal

Not only is moisture a non-combustible, but it absorbs heat because it must be vaporized and discharged at stack temperature. Where the moisture percentage is small this is not such a serious

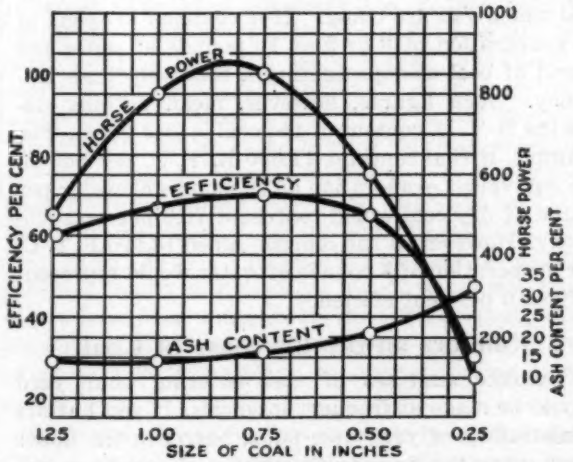


Fig. 2

Influence of size of screenings on capacity and efficiency of a stoker fired 500 H.P. boiler

matter, as one per cent of moisture amounts to only one-tenth of one per cent of 13,000 B.T.U. coal if we assume somewhat high stack temperature of 700 degrees.

Another point with respect to moisture is important, the usual chemical analyses of coal do not show all of the moisture. The reason for this is that there is considerable amount of water which cannot be driven out of the coal even at 220 degrees F., but remains in chemical combination usually as a carbohydrate which can only be driven off with volatile.

*Fig. 1 and Table I are based on data presented in "American Fuels" by Markus Campbell of the United States Geological Survey.

In a typical West Virginia coal, 13 per cent of the volatile has been found to be water. In a typical Illinois coal 25 per cent of the volatile itself is non-combustible in the form of water. The analyses of

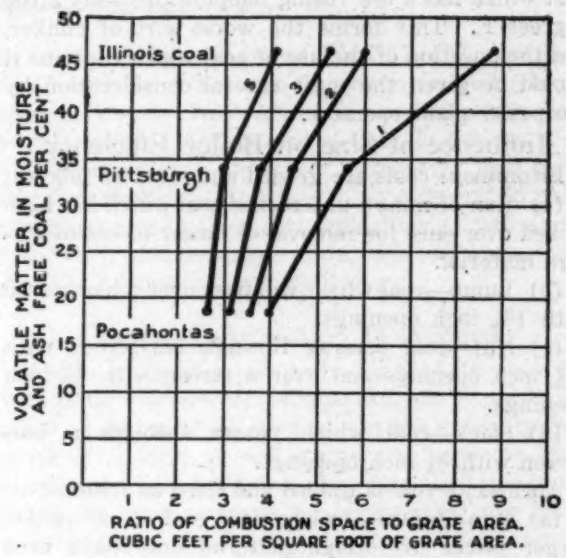

VOLATILE MATTER IN MOISTURE AND ASH FREE COAL PER CENT
Illinois coal
Pittsburgh
Pocahontas
RATIO OF COMBUSTION SPACE TO GRATE AREA.
CUBIC FEET PER SQUARE FOOT OF GRATE AREA.

Fig. 3

these two coals for which we are indebted to Mr. E. G. Bailey is given in Table II. This means that in making comparative appraisals of coals from different fields or in purchasing coal under specification the moisture content of the volatile as well as the free moisture should be taken into consideration to secure accurate results.

Ash

Ash is a complex compound consisting of iron, lime, alumina, magnesia, silica, titanium and various alkalies.

It is to be considered from two points. First, in buying coal with any appreciable precentage of ash in it, you are paying not only the first cost but also freight and handling charges all through your plant for so much inert material. The Second is of ut-

Completeness of Combustion, Percent of Undeveloped Heat	Rate of Combustion, lbs. per sq. ft. of Grate per Hour	Excess of Air, Percent	Cubic Feet of Combustion Per Sq. Ft. of Grate Area		
			Pocahontas	Pittsburgh	Illinois
5	50	50	2.7	2.9	4.3
3	50	50	3.2	3.7	5.3
2	50	50	3.6	4.4	6.3
1	50	50	4.0	5.6	8.9
0.5	50	50	4.8	6.8	11.9
5	25	50	2.0	2.2	3.5
3	25	50	2.3	2.7	4.35
2	25	50	2.7	3.1	5.1
1	25	50	3.4	4.0	6.2
0.5	25	50	4.0	5.0	7.1

most importance. It concerns us with the fusing temperature of the ash and the actual temperature to which the ash is subjected in the furnace. There are coals, the ash of which has such a high fusing temperature that there are practically no fuel bed conditions which will produce troublesome clinker. Next we find a different type of ash with a lower

fusing temperature. This ash will clinker, but in doing so it forms a porous spongy mass which does not materially obstruct the flow of air nor prove difficult to remove. The really troublesome ash is that which has a low fusing temperature—say 2,100 degrees F. This forms the worst sort of clinker, and the question of the use of coal which contains it should be given the most careful consideration by the power plant operator.

Influence of Size on Boiler Efficiency

Bituminous coals are graded and sized as follows:

(a) Run-of-mine—unscreened coal which has been picked over only for removal of larger pieces of foreign material.

(b) Lump—coal which will pass over a bar-screen with 1¾ inch openings.

(c) Nut—coal passing through bar-screen with 1¾ inch openings and over a screen with ¾ inch openings.

(d) Slack—coal which passes through a bar-screen with ¾ inch openings.

Anthracite coal is graded and sized as follows:

(a) Run-of-mine—unscreened coal from which larger pieces of foreign material only have been picked.

(b) Lump—classed as 6 inch, 3 inch, and 1¾ inch, according as the coal passes through circular openings of the larger diameter and over openings of the smaller diameter.

(c) Nut—classed as follows:

Three inch—smaller than 3 inch and larger than 1¾ inch in diameter.

One-and-Quarter-inch—smaller than 1¾ inch and larger than ¾ inch.

Thee-quarter inch—smaller than ¾ inch diameter and larger than five-eighths inch.

(d) Screenings—everything which passes through a 1¾ inch screen.

The size of coal affects the draft of the furnace and influences the capacity of the boiler. Thus, the presence of large quantities of fine coal and dust will materially check the flow of air through the fuel bed. When fine coal is used thin fires are necessary, and this usually results in a decrease in boiler efficiency due to the presence of holes in the fire.

The percentage of ash in fuel generally increases materially as the size of the coal decreases. The explanation is that dust and small pieces of foreign material from the roof or floor of the mine, having been separated from the larger coal naturally find their way into the smaller coal. Fig. 2 illustrates the influence of the size of screenings on the capacity and efficiency of a 500 horse power boiler fired by chain grate stokers.

The size of coal best suited to individual plant operating conditions should be determined by a series of tests. Once the most efficient size has been determined it will be found profitable to insist that all deliveries conform to this size.

Combustion Space Required for Various Coals

Different coals require different combustion spaces—the size of the combustion space required being principally determined by the quantity and quality of the volatile matter, as indicated by the ratio of volatile carbon to available hydrogen, and also by the oxygen content of the coal on a moisture and ash free basis. As an illustration of the influence of chemical composition of coal on the combustion space required, we include Table II which shows the space requirements for three typical coals under various conditions.

Fig. 3 furnishes an illustration of the point that the size of the required combustion space is dependent upon both the quantity and quality of the volatile matter and does not depend upon the percentage of volatile alone.

It is well worth while to have the combustion space in your furnaces checked up against the coal which you are now buying. In putting in new boilers be sure that the combustion space in the furnaces is designed for the coal which you can buy to best advantage.

B. T. U. Content of Coal

It is important to know the B. T. U. content of the coal which you are using. It is common to speak of an evaporation of 8 or 9 or 10 pounds of water per pound of coal as representing a relatively high efficiency. Such figures, however, mean nothing unless the B. T. U. content of the coal is also given. For example, if coal contains 11,000 B. T. U. per pound, the equivalent evaporation of 78 pounds of water per pound of dry coal would represent 70.5 per cent efficiency. However, if the coal contained 14,000 B. T. U. the evaporation of 8 pounds of water would represent only 55.5 per cent efficiency.

Pointers on the Purchase of Coal

Complete analyses of coal entering your yard should be made at frequent intervals. If you haven't a laboratory of your own put a barrel in the boiler room, have the fireman throw in a shovel from different parts of the car to be tested, then mix and quarter the contents of the barrel until you have a representative sample which you can forward to the nearest testing laboratory. In making a contract for the purchase of coal under specifications the following points should be taken into consideration:

(1) Amount and description.

(2) Time and condition of delivery.

(3) Adjustment in price for variations in B.t.u. content, moisture, and ash.

(4) Method of sampling.

(5) Designation of laboratory.

(6) Disposition of acceptable coal.

Proper selection of coal is at the very foundation of efficient power plant management. Time invested in the study of this question will pay rich dividends.

Competition and Costs

By T. J. BURKE, C. A.
Secretary-Treasurer of the Cost Association of the Paper Industry

THIS is a difficult subject to write about, because of the many influences which may have a bearing on it. The Cost Association, of which I have been Secretary-Treasurer for nearly three years, has one primary object in view in its work for the pulp and paper industry, this object being to convince all pulp and paper manufacturers that the best way to put their industry on a sound economic basis is by the use of correct cost estimating and cost finding methods and their proper application in conducting their business. This industry is no different to many others. Among those in the industry are many manufacturers, who while they are convinced that selling prices should be predicated on cost prices, state very readily that they are unable to follow this practice, owing to the severe competition to which they are subjected.

Many are the panaceas which have been proposed from time to time in an endeavor to correct this situation, and we all remember occasions when these panaceas have failed miserably and, in fact, have on several occasions brought big losses to those who put their faith in them. It would appear that there is only one right and legal way to put this industry on a sound economic basis and it is my belief that the forces which are working toward this end are making slow progress toward their goal. It is not possible, however, to run before one can walk, and this should be remembered by those in the industry who may be led away by outside connections, proposing schemes, which in their belief will do in months what others have been unable to do in years, because these schemes might possibly have a very bad retroactive effect on what has already been accomplished along sound lines.

Of course, the primary necessity is to build up confidence among the manufacturers themselves that they will not resort to unfair practices, and included among these unfair practices should be the practice of selling products below what they actually cost to manufacture. In those cases, where this practice is followed by manufacturers who are aware before hand of the loss they will incur there undoubtedly exists good reason for complaints of **unfair competition**, but in my belief such cases are few. In by far the larger number of cases where products are sold below the amount which it cost to produce them, the manufacturer who makes the sale is more or less doubtful as to the exact cost to him, because he either has not an effective cost organization, or, if he has one, has never learned to rely on the figures given him by that department.

It is unfortunate, but from my experience it is true, as on many occasions I have heard manufacturers complain that the figures given them have been incorrect. How often the manufacturer has been correct in his statement or at fault, it is not possible for me to say. Certain it is, however, that such cases are numerous, and it is in an endeavor to help manufacturers in their **cost** difficulties as well as to assist their cost departments in their **problems**, that the Cost Association is functioning.

Correct Information Is Needed

If some authorities are to be believed, there is in front of us a severe competitive era, but even if it is not to be severe as we are told, yet the necessity for constructive work in cost matters is none the less important. Why hesitate? The fact that questionnaires and other requests for information may take up too much of the time of your organization often causes these requests to go unheeded. I am not denying the fact, that this industry like many others, has been, in the past, bombarded with questionnaires, but the fact remains that it is very difficult for an Association to make real progress, especially one endeavoring to make progress in such a subject as **Cost Accounting**, unless the mills in the industry are willing to contribute a certain amount of their time as well as their money in the work.

Some of the cost accountants in the industry are at times unwilling to put forward the necessary effort to get together the figures asked for, or else are not willing to state clearly their objection to doing so. Let us be as frank with each other as we can, for only in that way shall we make progress quickly. Our big effort, at this time, is being directed toward convincing pulp and paper manufacturers of the vital necessity for a proper comparison of their **Conversion Costs**, so that they may be in a position to ascertain just how each one stands in relation to his competitors. We all know cases of mills who have consistently lost money, and in some of these cases, I have heard it said that they could not expect to do anything else, because of some particular reason which rendered the mill unsuitable for the purpose for which it was being used. What is the result? The company eventually goes bankrupt and is **bought in** by other interests at half its real value and these interests are then, of course, in a position to manufacture at a cost which will enable them to go out and undersell others who have had to pay full price for their mill.

In all probability, in the first place, if the owners of the mill had had available reliable figures for comparison with manufacturers making similar products,

they would have saved themselves thousands of dollars and prevented this money from being used, which is practically what it amounts to; to bring down the selling prices of the products to a point where owners of mills, who have paid 100 cents on the dollar for their mills, find it difficult to meet the competition.

As an instance, it would be interesting to know what is the appraisal value of the mills recently sold for a little over one million dollars, which were formerly the property of the American Straw Board Company. If any of my readers have any data available, showing what this value might be said to be, I shall indeed be glad to see it.

Undoubtedly, such cases as this will continue to appear in the trade journals from time to time, and their number will increase as competitive conditions become more severe, unless concerted effort is made by all manufacturers of the industry to put in on a sound economic basis, as before stated, by refusing to sell their products except at a fair profit, or, at any rate, at not less than what it cost them to produce these products. This, of course, absolutely necessitates that manufacturers in the industry shall once and for all **know** their **conversion costs**, or if you prefer, their **manufacturing costs.** By this I mean to say not only that each mill should have a good cost department, but further, that each mill should be willing to spend a little time in answering questionnaires, and preparing statements to show how it compiles its costs, thereby permitting a proper comparison of them with those manufacturers making similar products.

A Paper Exchange

This is the real and logical way—not to say legal—of approaching this problem. If there are better ways I would like to know them. In this connection, I might mention a suggestion put forward recently that pulp and paper companies should form an **Exchange** for the purpose of disposing of their products. I have given some thought to this proposal, but must confess I cannot understand how this will put the industry on a sound economic basis. On the other hand, it appears that unless anything which under the present law is illegal is done, it will have quite a contrary effect, and will be instrumental in driving down selling prices, particularly when competition is severe. In those exchanges which are now operating, the **bears**, when they are convinced that things are on the toboggan, take the oportunity to line their pockets by selling the market **short**, thereby demoralizing those who up to that point have had sufficient confidence to retain their holdings. What is to prevent a big buyer of newsprint for example, from selling the market **short**, when the price has reached the point where he is satisfied to buy, covering his commitments and replenishing his stock. Of course it will be stated that he would find it difficult to cover; that, however, would depend on the condition of the market. If it were known that the demand was below the supply, then I do not doubt, that he would have little difficulty in **covering.** At any rate, it would seem that the battle would be one of dollars rather than of legitimate competition. The longest purse always wins on the exchange, and for this reason, I personally feel that the establishment of such an exchange, as is proposed, would be a step in the wrong direction for the pulp and paper industry.

I am prepared to be convinced to the contrary however, particularly in view of the fact that men of great deal more prominence than I in the industry, have permitted their names to be used in connection with this proposal. I shall therefore follow the course of events with very much interest, but doubt that it will ever be possible to establish such an exchange for all grades of the industry.

A Valuable Book

Before closing this article, in connection with the appeal which I have made to manufacturers, and their cost departments, to give a little more of their time to the consideration of questionnaires, and other requests for information received by them from their associations, I would like to draw attention to the very fine book on "Trade Association Activities," recently published, at the small price of 50c, by the Department of Commerce. This book contains an introduction by Mr. Herbert Hoover, which in itself is worth the money. I also wish to draw particular attention to Chapter II, entitled "Legal Aspects of Statistics," written by Commissioner Nelson B. Gaskill, of the Federal Trade Commission. This chapter deals with the legal side of statistics in a most comprehensive and fair manner, and I commend it to all manufacturers in this industry as well as their staffs with the suggestion that they should take the first opportunity of reading it.

Mr. Gaskill says, "Out of free competition the law expects birth, growth and full development of economic life, and its healthful existence as a condition in which all have equal opportunity to share."

"Free" competition should not necessitate selling below cost, or even without profit. This is not a "healthful existence." Manufacturers in this industry, as in many others, have every right to take steps to compare their manufacturing costs and we should get busy and do this as promptly as may be. Mr. Gaskill concludes his chapter with the words, "Trade Associations must hitch their wagon to a star." I fully agree with him on this point but would like to add that the manufacturers who support these associations should "keep their feet on the ground and study their costs."

So that new stenographers will be conversant with the plant and its products which she will be writing about, the official for whom she is to work takes her through the factory and explains briefly the different processes. This plan is in effect at the Strathmore Paper Company.—Factory.

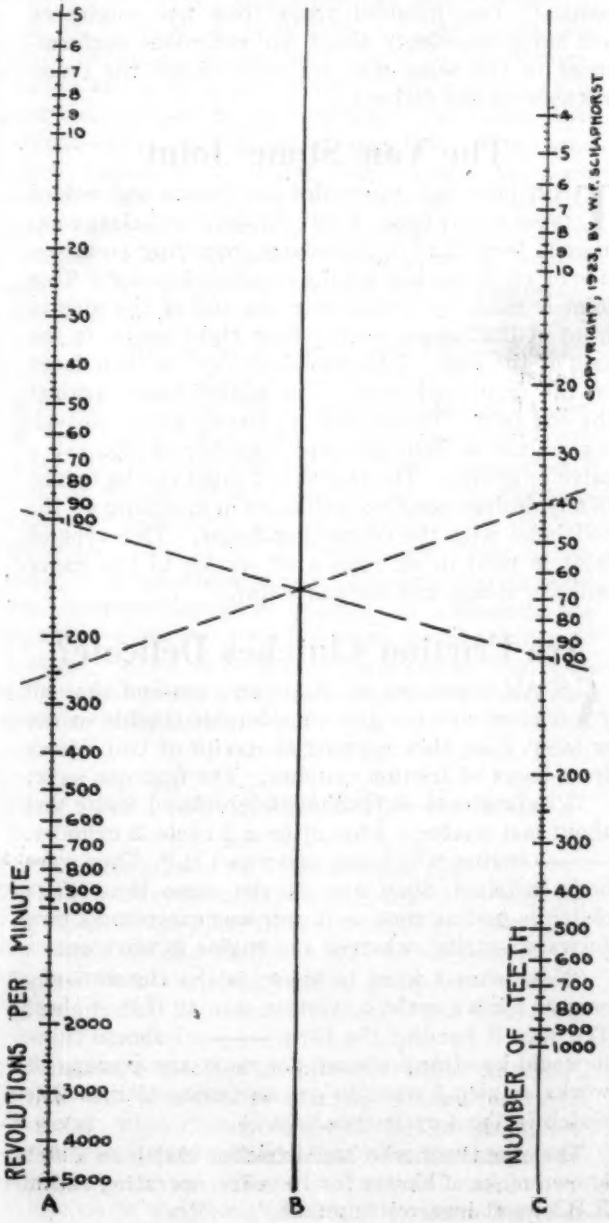
Pointers for the Engineer

By W. F. SCHAPHORST, M. E.

A Useful Chart for Figuring Gear Speeds

KNOWING the number of teeth in two intermeshing gears and knowing the speed of one of them, the speed of the other is immediately and easily determined by means of this chart.

Or, knowing the speed of the two shafts, and knowing the number of teeth on one of the gears, the number of teeth on the other gear is just as easily determined without counting.



To use the chart is a very simple matter. Merely lay a straightedge across twice, as indicated by the two dotted lines drawn across the chart, and the answer is instantly found.

For example, a gear having 100 teeth rotates 100 R.P.M. The other intermeshing gear has 40 teeth. How many R.P.M. does the latter gear make?

To use the chart, connect the known R.P.M. with the known number of teeth on that gear, or, connect the 100 with the 100 and locate the intersection with Column B as has been done with a dotted line on this chart. Then run a straight line through the known number of teeth on the other gear, Column C, which is 40, and through the intersection with Column B and the intersection with Column A gives the answer as 250 R.P.M.

In other words, the number of teeth on any gear multiplied by the number of R.P.M. it makes, is equal to the number of teeth on the other gear multiplied by the R.P.M. the other gear makes.

If this chart is not as refined as it should be when making certain calculations requiring extreme accuracy, it will at least serve as a good rough check on one's figures.

It will be noted that the range of the chart is great enough to take care of almost any gear problem, the R.P.M. ranging all the way from 5 to 5,000 R.P.M., and the number of teeth all the way from 4 to 1,000 teeth.

Be Cautious About Buying Welded Pressure Tanks

I DO not want to create the impression that all welded pressure tanks are not good. They ARE good when the welding is done properly—by individuals or concerns who understand the welding business and who do it as it should be done.

A number of serious failures of welded pressure tanks have occurred, making it evident that considerable care must be exercised to be certain that the work is well done when welding tanks for carrying high pressure. Welding of this important nature must not be entrusted to an unskilled welder. The purchaser should be certain that he is buying from a responsible concern—a concern that will not tolerate slip-shod welding. To weld with a modern welding outfit appears to be a comparatively easy matter and many unskilled men, after making a few welds, are liable to consider themselves so expert

that they will undertake any kind of work. However, correct welding is a science in itself, requiring considerable study and experience.

For example, during the welding process internal stresses are liable to be set up due to the fact that at the welded seam a very high temperature is created during the welding act. Then after the weld has cooled down the metal shrinks and as a result there is bound to be an internal stress of some kind. This internal stress should be relieved by annealing, but since annealing means additional expense, irresponsible concerns are liable to skip this operation, whereas the best concerns insist on it in spite of the greater cost of the completed vessels. The best concerns also insist on the most capable welders obtainable, so as to reduce the "personal equation" to the minimum.

The use of welding tanks has increased a great deal during recent years and the science of welding has advanced to a gratifying degree. The writer is in favor of continued advancement. There is no better way to make tanks tight against leakage than by welding. There is no reason why welded tanks should not be just as strong, or stronger, than riveted tanks. When correctly done they are stronger. However, when investing, be cautious.

The Heater in the Small Paper Mill

IT IS a fact that many engineers of small steam plants consider it excusable, merely because of the smallness of the plant, to do without economizing devices such as feed water heaters. They think that economy is profitable only when practiced on a large scale. For this reason many small plants consist of nothing but a boiler, an injector and a simple non-condensing engine.

At least one boiler is needed in any steam plant, and in many such plants one is sufficient where a heater is provided to keep scale out. In this way the boiler needn't be cleaned and overhauled, so often and continuous operation needn't be feared so much, but if the engineer is bound to do without a heater, and if power demands are almost continuous, another boiler had better be installed, so that one can be cleaned thoroughly while the other is in use. Now, since a heater doesn't cost as much as a boiler, doesn't it seem logical that the heater should be given preference?

An injector, although uneconomical, is allowable as an adjunct to a pump, but if there is no pump, install one. There are many good inexpensive pumps on the market. The pump will enable the engineer to force hot water (which has been heated in the heater by the very exhaust steam that is probably being wasted now) from the heater into the boiler, thereby saving from 10 to 15 per cent of the coal.

A simple non-condensing engine in a small plant is commendable, but wherever one can make profitable use of its exhaust steam as in a heater, in heating systems, processing systems, etc., I recommend that it be done. No matter how small the plant, nor how cheap the coal, you cannot honestly convince yourself or the owner of your plant that no heater is necessary. It eliminates scale, oil, and suspended particles (for heaters are usually provided with oil filters and separators); preheats and purifies the water; saves labor, coal and boilers; receives condensates; and minimizes danger.

Even if the plant is a large one, if the engines run condensing, if the scale contains sulphates, or if storage capacity for hot water is wanted, manufacturers make types and sizes that will quickly pay for themselves. Theer are many ways of economizing, even in plants that are now considered highly economical. One hundred years from now engineers will smile knowingly about our ridiculous performances in the same way we smile about the crude methods of our fathers.

The Van Stone Joint

THIS joint has superseded the shrunk and welded types and is today about the only first-class commercial joint that is dependable, requiring no attention or renewing beyond the occasional gasket. This joint is made by rolling over the end of the pipe in front of the flanges until it is at right angles to the axis of the pipe. This so-called "lap" is then faced on the front and edge. The gasket bears against the end face. The flanges act merely as two swiveling collars to hold the pipe together or against a valve or fitting. The fact that flanges can be turned to any desired position facilitates in matching up the bolt holes with the connecting flange. This type of joint is used in all classes of service in the paper mill, for steam, gas, air and water.

Are Friction Clutches Delicate?

AS AN argument to those who contend that all friction clutches give considerable trouble sooner or later, I am this morning in receipt of two letters from users of friction clutches. The first one says:

"I have a ——— friction clutch that I wrote you about last winter. I had it on a 2 cycle, 2 cylinder, ——— engine, which you said was 7 H.P. They were both installed when new at the same time. The clutch is just as good as it ever was excepting a new forward bearing, whereas the engine is worn out.

"Now what I want to know, is the clutch heavy enough for a 4 cycle, 4 cylinder, 9 to 12 H.P. engine? The way it handled the little ——— I should think it would be strong enough for most any power. It works so nice I want to get an engine to meet the clutch in the 4 cycle type."

The other user who had a friction clutch on a well known make of blower for 10 years, operating at 233 R.P.M. and transmitting 5 H.P., writes:

"After running your ——— friction clutch for ten years or more without trouble, it commences to refuse to work. Taking up on the friction screw had no effect. The only way we could get it to run was by shimming the wedges and it seems to hold at present. Perhaps it needs a new friction ring, also new wedges. Please send the repair parts required. This is a single clutch, 1 15/16" shaft."

The above is not a denial that friction clutches wear out because anything subject to friction will wear out in time. It is a denial, however, that ALL friction clutches are delicate, and that they give everlasting trouble.

What Color Paint?

THE following colors have been recommended by an A. S. M. E. committee for identifying pipe line. Applying these colors only to the fittings, valves and flanges, is sufficient. The piping may be painted any color to harmonize with the room. Live steam—white. Exhaust steam—buff. Low pressure water—blue. Boiler feed water—blue and white. Salt water— green. Air—gray. Lighting gas—aluminum. Gas engine pipes — black, red flanges. Fuel oil—black. Refrigerating pipes—gray. Refrigerating flanges and fittings—white and green strips.

Pipe Bends

IN these days of high steam pressure and superheat, pipe bends play a very important part. They, (1) Provide elasticity. Joints are protected against severe stresses and strains. (2) Compensate for expansion and contraction. (3) Reduce frictional losses to the minimum. (4) Make it possible to avoid obstructions (columns, foundations, etc.) without the use of fittings. (5) Minimize the number of joints. (6) Minimize the possibility of leakage. (7) Can be made in any shape. (8) Can be furnished with any type of flange—screwed, cast iron, or forged steel.

High Test Container Board

BY CHAUNCEY E. COLE

Superintendent The Cincinnati Paper Board Co.

THE writer has always found that high test container board gives the superintendent more cause for worry and the machine tender less chance to go to heaven than any other grade of board. There is seldom found two superintendents who follow the same procedure in making it.

It is the writer's opinion that in order to make a test board the machine must be specially equipped. However, when it is so equipped it is not possible to make heavy board successfully without rebuilding the vats.

The circle of the vat should be not more than two inches from the mold. This will make it possible to close the sheet better, as all good test board should be. The felts also must be of good quality and open, woven so they will not mark the sheet and they must be kept clean at all times. Dirty felts cause blows and uneaven drying.

We have noticed that after a top felt has been run for three weeks it has a tendency to fill up and pick. To offset this, the machine tender will draw the slice boards down tighter, which often causes a slight check in the board, but so slight at times as to be scarcely noticed. This, however, will absolutely kill the test.

The process of drying test board is very important and cannot be hurried. Uniform drying depends to a large extent upon properly ground and crowned press rolls.

The writer does not believe live steam should be used to dry test board; in fact, it is hardly necessary if the syphon pipes are in good shape and the dryers are free from air. If live steam is used it should be on the last 24 dryers and should not exceed 30 pounds. The wet end section should have from 5 to 10 pounds of exhaust steam. This will enable the board to dry slowly, for too much heat on the wet end dries the liner sides rapidly, leaving the inside wet, which causes cockles. Then in order to overcome these cockles the sheet must be pulled up tighter at the draws, thereby stretching and weakening the sheet, which also weakens the test.

For finishing the board we usually use three stacks. Other mills use only two, with a steam spray or one hollow roll for live steam. This, many consider, will give the same finish as is obtained with three stacks.

The beater room, however, is where test board is really made. It is preferable to use nine beaters for the ordinary sized machine. Unless we have this number, we must double-Jordan the filler, as this must be the slowest stock. The stock must be slow and the fibers drawn out. The water should be warmed just enough to cause the stock to beat up readily. If it is too hot the stock will become free. Dirt is one enemy which must be overcome in the beater room. There are now several beating systems on the market which claim to take care of this.

Unless we get the dirt out we must expect trouble, and to help this we install sand boxes with deep pockets between the stock box and Jordans.

Another thing, the underliner and bottom liner must be a little freer than the filler. This will enable the water to leave the sheet more readily and not cause blows or air marks. This is important, for in the liner we find the foundation for the test.

In making test board some mills use Kraft pulp and others Kraft paper. We prefer good old Kraft papers if our beater capacity is limited. As Kraft paper has been beaten up once it works up more readily if used proportionately to Kraft pulp. I do not believe in putting all the good stock in liner, as

you can positively get more test by using less in the liner and sweetening up the back and filler stock.

With sulphate pulp one runs into many problems. The writer once had charge of a test board mill that had a sulphate mill in connection. I remember one morning of going into the mill and finding the sheet soft and spongy and the color way off shade. I went to the beater engineer and came near discharging him for not putting in the color, size and alum.

We put some color and alum in the machine chest and to my amazement it did no good. I then examined the beaters and found by sqeezing the stock it had a muddy color. I at once tumbled to the fact that the liquor was not properly washed out of the sulphate pulp, and was killing the size, alum, color and test. There is a great deal of soda ash used in making this liquor, and you all know what that will do to your stock.

Industrial Accident Prevention Work

By J. M. SANDEL
Safety Engineer, National Safety Council

THE National Safety Council has recently compiled the accident experience of some of the members in eight different industries. The length of the various periods varies, but this information, while somewhat incomplete, can serve as an index of the progress of the safety movement, and as a guide for present activities.

These industries are the automotive, cement, construction, steel plants with foundries and machine shops, paper and pulp mills, petroleum refineries, rubber mills, and woodworking industries. Of all these industries, the records the Council has of the cement industry are more complete than any other. This information was available through the offices of the Portland Cement Association, and practically every cement company is a member of the Association. While the severity rate for that industry is high, it reflects not only the well-known hazards of the industry, but also the more complete reporting of unfavorable as well as favorable experiences. While the natural tendency to avoid publication of poor records is manifest in all of the statistical work of various sections, and which makes the National Safety Council's statistics incomplete, it is the best collection of information on accidents that there is available anywhere.

It cannot be said of the members of the Paper and Pulp Section of the National Safety Council that they have been at all reticent in sending their accident records to the Council. There are repeated instances where poor records have been sent in by a member company and that they recognize the fact when they sent the information. Therefore, although the paper and pulp mills rank fourth in the entire list, their average severity rate of 2.62 is an excellent "bogey" for the industry. The complete records of the members were published in the April issue of THE PAPER INDUSTRY.

The safety department and the plant manager, who are interested in preventing accidents, should therefore look over their past experience and their plant to see what can be done to reduce the number of accidents, and to get the record of their plant way below the average for the industry. Local conditions will be quite a factor in this work. An analysis of the accidents that have occurred is necessary. The investigation would likely include the rate of labor turnover, physical examination of the men, lighting of the premises, or even individual home troubles of employees and fatigue.

ACCIDENT RECORDS

Industry	Period Covered	Aver. No. of Employees (one yr. basis)	No. of Hours Worked	No. of of Accidents	No. of Days Lost	Frequency Rate	Severity Rate
Automotive (Automobile & Motor Mfg.)	1922	85,145	203,086,831	3,822	173,592.5	18.82	0.854
Automotive (Automobile Parts Mfg. & Metal Stamping)	1922	6,589	15,936,283	588	20,266.1	36.98	1.271
Cement	1919-22 (4 years)		233,950,909	9,977	1,556,200	42.65	6.656
Construction (General contractors)	1922	7,188	17,527,467	1,268	101.214	72.37	5.775
Construction (Structural steel erectors and fabricators)	1922	1,509	3,949,445	564	21.421	142.82	5.421
Metals (Steel plants, Foundries, Mchry. Mfg., etc.)	1922	81,900	208,671,833	9,476	325,066	45 41	1 557
Paper & Pulp	1920-22 (3 years)	103,385	257,854,410	11,773	675.755	45.68	2.620
Petroleum	1921-22 (2 years)	37,184	99,825,149	3,458	186.097	34.64	1.864
Rubber	1921-22 (2 years)		206,253,000	6,627	185,412	32.13	0.898
Woodworking	1920-22 (3 years)	58,550	155,253,151	9,124	380,204	58.77	2.449

The complete analysis of accidents should include the locations where accidents have occurred, experience of the injured employee on the job where he was injured, the length of service with the employer, physical condition of the man injured, such as defective eyesight or inability to hear, peculiar physical conditions of the location, contributing factors such as equipment, machinery, or other employees, so as to determine the primary cause of the accident.

A complete analysis of accidents of all kinds, whether major or minor accidents, will reveal the locations in the plant needing attention most because of frequency, and the kind of accidents that are the most frequent. For example, if slippery floors are the cause of a large number of accidents, this matter should be looked into and remedies applied wherever slippery floors are found in the plant. It may be that abrasive floor plates will answer the question, or that it is possible to drain off the water or remove other substances which make the floor slippery. Dust and other factors produce a slippery condition and there are various ways to overcome them. By taking each cause or each type of accident separately, it is possible to plan a safety campaign extending over quite a portion of time so that each of these causes will be given proper consideration and the necessary remedy applied in due time.

The attitude of the manager is important. The executive who says "I want those accidents prevented" to his foreman, and says it in a way that they know he means it, is going to get results. Many a foreman has watched the men in his department closer to see that they are not performing any unsafe acts and are respecting all safety devices and leaving them in place at all times when he knows that the big boss is depending on him to report a clean slate. When this word is passed on to all employees, and they realize that safety is one thing they can't joke about, the reports of accidents will diminish instead of increase.

The analysis will most likely also reveal that many of the accidents can only be prevented by educational measures. The application of such measures should be in the hands of the foreman, who could be properly advised of what is desirable to teach employees. Often times the right and wrong ways of doing work are easily apparent; at other times, it needs extended study, similar to time studies made for the purpose of setting piece rates. The National Safety Council bulletins are examples of the way that the right methods of doing work can be presented to employees. But it is most important that, once the safe method of doing work has been approved, that the foreman shall insist that it be carried out.

Throughout any of this work, it is important that first aid shall not be neglected. No matter how slight the cut or scratch be, the employee should be sent to the dispensary for first aid treatment, rather than allow some amateur friend of his to bind up the wound. Infections, which cause so much lost time, are avoided in this way and a good habit is thereby fostered.

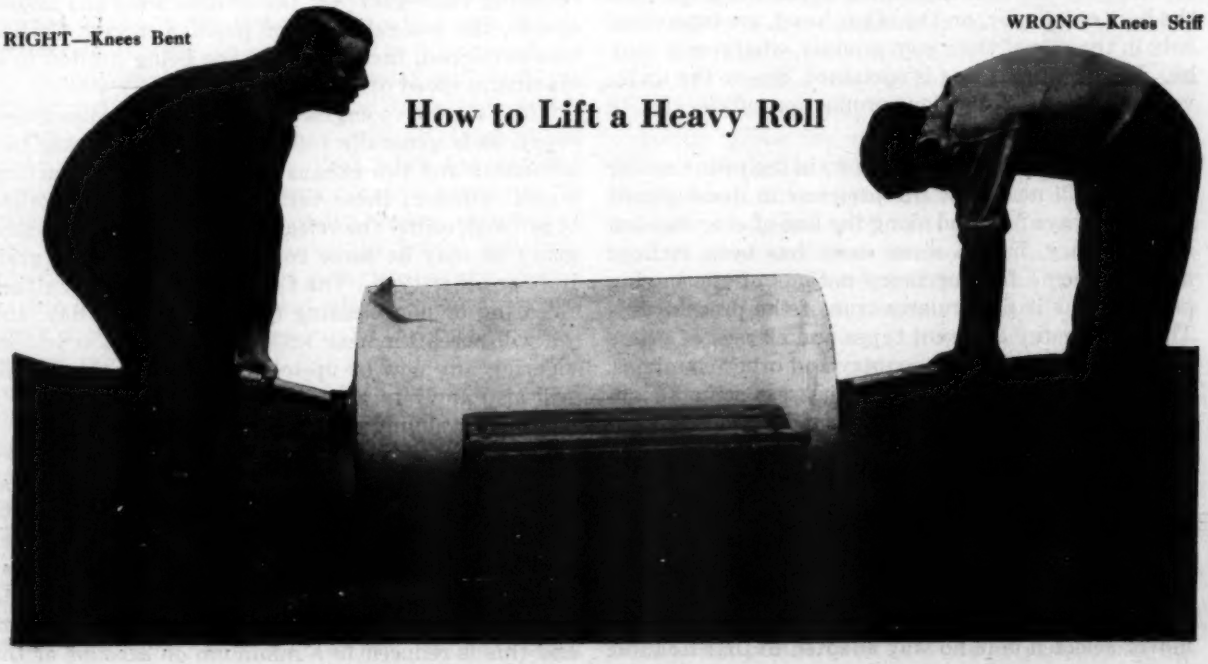
Safety is very important in production, for it helps to maintain production.

A spaghetti manufacturer, planning to market his product in Cuba, has learned that the duty on spaghetti is quoted at so much per kilo. He is trying to find out whether this refers to kilograms or kilometers.—The Credit Monthly.

How to Lift a Heavy Roll

RIGHT—Knees Bent

WRONG—Knees Stiff



The Power System

Prime Movers

BY JOHN F. FERGUSON
Ferguson Engineers, Chicago

IN AN earlier article the writer referred to the increasing percentage of all steam-driven paper mills, due, first, to the large percentage of new mills that are steam driven; second, to the possibilities of the paper mill to manufacture their own power much cheaper than can generally be supplied by public utilities, and third, that the other classes of manufacturers and public utilities can well afford to outbid the paper mill for water powers, so that many of the all or part water-power-driven mills will eventually be all steam-driven mills. Progress along this line of development has been slow, partly on account of the lack of knowledge of what can be accomplished in power generation and the economies that can be effected, which accounts for the lack of equipment to gain the results and lower cost of product that the people are entitled to.

This article will deal with the question of prime movers, referring to the use of certain types or classes, their advantages and their disadvantages in the paper industry, and will be confined to steam units only. The paper industry and paper mill engineers have not given this subject the attention and study which it commands or deserves. In most cases they have turned over their rough requirements to the salesmen and manufacturers to determine the prime mover best adapted to meet their conditions, and who in most cases know very little of the class of unit that will best meet their needs and give them the best results, or, on the other hand, are interested only in the sale of their own product, whatever it may be. Hence a great loss is sustained, due to the undeveloped field, for the low production efficiencies in this line of industry.

If we look back over the history in the prime mover field, we will note that the progress in development has not always followed along the line of ever increasing efficiency, but in some cases has been inclined to follow some fads or fancy notions of the buying public. This is particularly true of the present day. There are many different types and classes of prime movers throughout this country and other countries, and while some types no doubt possess some advantages over other types in different locations, a very few of the engineers or users realize their advantages or consider same in making a selection of a prime mover. They are governed more by some fancy notion or prejudiced opinion, rather than by the adoption of the best type to meet their particular demand, with the result that we have in our industrial plants many ill-fitting installations in which the prime mover selected is in no way adapted to that location.

In most cases, the most economical unit is the best prime mover to select, provided all other conditions are equal. It generally follows that the more economical unit requires an additional investment, particularly with a steam turbine, so that in such a case it will be necessary to compare the fixed charges, etc., against the greater efficiency in order to make the best selection. The following items may to a more or less degree have a bearing upon the selection of a prime mover: the space available and dimensions of the unit; the first cost of the unit completely installed; the efficiency of the unit in steam rate per unit of power at the load range, which will be common to the unit; the manufacturer's time for delivery of the unit; the quality of workmanship in the machine; and the reputation, reliability and standing of the machine manufacturer.

The classes of prime movers here referred to in general will be those most common to the paper industry, including steam engines of the throttling governor, four-valve, counter-flow, single and compound, and unaflow types, and steam turbines.

Four Valve Engines

Perhaps the type of engine that most of us in this country are best acquainted with is the Corliss engine. This engine will be found in every class of industrial plants or central stations, and very little need be said of it here. The larger units have the releasing valve gear; for the smaller sizes and faster speeds, the non-releasing or positive motion Corliss was developed, the releasing type being limited to a maximum speed of 125 to 150 R. P. M.

The Four Valve engine (of which the Corliss is one type), as is generally referred to, is one having two admission and two exhaust valves in a double acting steam cylinder; these valves may be of the Corliss type (with either the releasing or non-releasing valve gear) or may be some rotary, piston, poppet, grid-iron, or other type. The Corliss Valve engine, either releasing or nonreleasing type, has had its day, and we will hereafter hear little or nothing of it in considering any new or up-to-date developments. This will also apply to any other type of valve having a wearing or sliding seat, unless of a balanced type.

As our pressures and temperatures increase we run into greater difficulties, due to internal lubrication of engines; hence, the adoption of a valve to reduce such troubles to a minimum. The poppet valve perhaps approaches our requirements as near as anything yet produced, because there is no sliding contact or wearing surface except the valve stem, and this is reduced to a minimum on account of the

large valve opening that can be gained with only a slight movement of the valve and stem. Some types of balanced piston valves are giving excellent results under extreme conditions. Pistons of engines must also be given the same consideration in this respect, for the future development or success of the steam engine will depend upon its ability to work under high pressures and temperatures with the minimum or even no internal lubrication. Already, certain English manufacturers are manufacturing steam engines designed for operation without internal lubrication, and certain American interests are prepared to proceed along this same line.

In the past few years, the use of internal lubrication of steam engines, which allowed the oil to eventually return to the boilers, economizer, etc., in the condensate causing considerable trouble, also oil in the steam, preventing its use in certain manufacturing processes, are some of the points that led to the decision of adopting steam turbine prime movers in preference to steam engines. As this obstacle is removed, however, the decision in the selection of prime movers will be more favorable to the steam engine.

Many engineers and operators have questioned the possibility of the steam engine to keep in line with the increasing pressures and temperatures, but any doubt along this line is due to lack of foresight and confidence in the reciprocating units. It is quite safe to say that we shall soon hear of reciprocating units operating at pressures and temperatures much beyond what has yet been attempted, and most likely beyond the limits of the steam turbine as to extreme conditions.

As referred to elsewhere in this article, it will be stated that the advantage gained by the Unaflow engine is due to the lower condensation rate within the steam cylinder, on account of the lower variation in temperatures between the cylinder walls and the initial and exhaust temperature of the steam, which is reduced to a minimum by admitting steam at one end and exhausting at the other, when the load and working back pressures permit such a condition. In the ordinary type of Four Valve engine, each end of the working cylinder becomes the hotter and then the cooler alternately in a complete return stroke, consequently the more heat absorbed and carried away with the exhaust steam, and the greater steam rate of the ordinary Four Valve engine under these conditions. This condensation rate, due to the variation in temperatures of the cylinder wall and steam, may be somewhat reduced by making the complete expansion from initial to exhaust pressure in two or more cylinders, or, otherwise, by making a compound Triple or Quadruple Expansion engine.

In this country, we have not gone much beyond the two cylinder or compound engine, except on slow running pumping engines, where in some cases the Triple Expansion has been developed. While in some of the European countries the Triple Expansion and Quadruple Expansion are very common. Higher piston speeds also contribute to reducing the condensation rate within the cylinder by reducing time of contact that the steam has with the higher and lower cylinder wall temperatures.

Unaflow Engine

Another type of prime mover which has gained considerable publicity recently, not because it possesses any marked advantage over the high-class Four Valve engine in the paper industry, but more on account of the advantages possessed in other fields and misinterpreted or over estimated in the paper industry, is the Unaflow engine. This engine possesses some advantages over some of the other types of steam engines under certain conditions. Its steam consumption follows almost a straight line or a more uniform rate throughout a wide range in load. This is very desirable for engines working on a varying load such as is encountered in some industrial plants where the motors are large and few and operate at intervals, or in small central stations where the load varies considerably. Primarily this type of engine was designed for condensing purposes, and in this line has met with success as an efficient engine, owing to a wide range in expansion from initial pressure to condenser pressure which could be economically accomplished within a single cylinder. This is due to the admission of steam at one end of the working stroke of the cylinder and releasing it at the opposite end (each engine cylinder representing two single acting working cylinders, the center port being common to both), so that the initial high pressure and high temperature steam enters at one end, and when expanded and cooled, departs at the opposite end, making the average temperature of the metal in the working cylinder considerably hotter at the admission end than at the exhaust end.

As the Unaflow engine became applied to industrial work demanding back pressure operation in order to utilize the steam for heating, drying and process work, the exhaust port at the end of the stroke could not satisfactorily permit of proper expansion of steam, take care of exhaust, and keep the compression within the limits of the initial pressure, without excessive clearances and large cylinder volumes. It became necessary, therefore, to make use of relief or auxiliary valves, at or near the admission end of the working cylinder to permit a part of the exhaust to pass, in order to keep down compression and reduce cylinder clearance and volumes. These relief or auxiliary exhaust valves may be operated mechanically as an exhaust valve or allowed to open automatically as a relief valve as the compression reaches a certain limit, or may be adjusted by hand to take care of certain conditions, or may be a combination of any of these.

If you study the different load conditions with different back pressures with the relief or auxiliary ex-

haust valve adjusted for the best efficiencies at each condition, you will find that the amount of exhaust steam that passes out of the central exhaust port will vary from 100 per cent to zero, or otherwise the steam passing out through the relief auxiliary valves will vary from zero to 100 per cent.

By referring to the diagram, Fig. 1, in which the load and cut off is such as to permit complete expansion of the steam to the exhaust pressure as shown by the heavy expansion line, and which represents a most economical load per I. H. P., it can be seen that no exhaust steam passes out of the open port at the end of the stroke, because there is an equal pressure

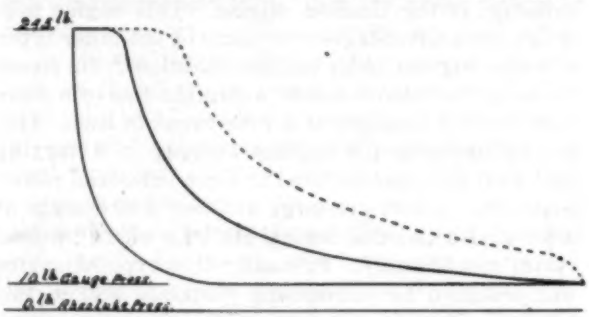


Fig. 1

inside and outside of the cylinder, and all the steam must pass out of the auxiliary exhaust opening on the return stroke.

As the percentage of the exhaust steam which passes through the center exhaust port decreases from 100 per cent, the advantages gained by the Unaflow principles begin to decrease. When the zero point is reached, the advantages have disappeared and the engine becomes a Four Valved single engine in principle with what disadvantages it possessed as compared with the actual Four Valve engine.

In the paper mill, where a working back pressure of 5 to 10 pound gauge is general, the amount of steam passing through the central exhaust port with the engine operating at its most economical load would be between 4 to 10 per cent, so that the actual gain in a paper mill where the load is comparatively uniform and with an engine of proper proportion would be very small indeed. After deducting the disadvantages which this engine possesses, such as higher first cost, greater space required, and lubricating difficulties, it becomes practically on a par with the Four Valve, single cylinder engine.

It must be admitted, however, that the Unaflow engine possesses advantages well worth considering and adopting when operating on a condenser, or a very low, absolute back pressure, and with varying light load conditions, but loses these advantages as the load and back pressure increases.

The question may arise, "Why not compound Unaflow engines?" In this case, the high pressure cylinder is working against an extreme back pressure from which no advantages could be expected, so that any gain in economy, due to any Unaflow principles, would have to be gained from the low pressure cylinder. Then to consider an engine with a Four Valve counter flow as a high pressure cylinder and a Unaflow cylinder as a low pressure cylinder would depend upon whether the total expansion from initial pressure to exhaust was of sufficient range to warrant more than one cylinder for expansion, the average load conditions and the exhaust or back pressure at which the low pressure or Unaflow cylinder would work against. For condensing engines, the latter combination would be most efficient and desirable, but when working under a normal load and back pressures, as common in paper mills, the over-all gain would be practically nil as referred to with the single cylinder Unaflow engine.

Again, referring to Fig. 1, if we study the two expansion curves, one of complete expansion and the other of over-loaded condition with incomplete expansion, or intermediate conditions, it will be seen that as we increase our working pressure and range of expansion, we increase the demand for a compound or multiple expansion engine, not only for the better steam consumption rates, but for more favorable mechanical principles in engine and machine design possessed by the compound and multiple expansion engines. The field, therefore, for the Unaflow engine is limited to low and moderate steam pressures and temperatures.

Variable Speed Engines

The Throttling Governor, Twin, Variable Speed, steam engine is one of the most extravagant types of prime movers that has entered the industrial field, and while it is true that such units possess many desirable features, such as simplicity, ease in control and a wide adjustment in speed, yet all of these features can be gained by variable speed engines possessing all the advantages of the above unit, without the great disadvantage of high steam rate, which will entirely eliminate this unit from industrial use as soon as engineers and users become educated to the practice of higher efficiencies. The statement or argument so often used in favor of the above unit by manufacturers and users who have not given the power problem of industry as close an examination as it demanded is, "That so long as the steam is used in the paper machine dryers, the steam rate of the engine is of little account." This is most absurd (except in extremely rare cases) and lacks the sound engineering principles so much demanded in the improvement of paper mill and industrial economy.

The so-called English type of engine (Vertical, Enclosed, Forced lubrication), not very well known to the American mills but well represented in the Canadian mills, represents one of the best types of prime movers so far adopted for driving paper machines where an engine drive is preferable. The advantages of this unit are simplicity, speed desirable for direct

connection to shaft of different types of mechanical drives, fair economy and small amount of floor space required.

Engines for driving paper machines, where an engine drive is desirable, should be designed along the line of the more economical engines for the prime mover; Horizontal, Cross, Compound units of Four Valve Poppet type, or Vertical, Multiple Expansion engines of the English type are perhaps the most desirable to meet future conditions and possibilities. A variable speed control and governor, necessary for a paper machine drive, can be applied to any type of engine.

Steam engine drives on Paper Machines in the future will not be considered seriously, on account of the simplicity, and the elimination of the many belts, gears, line shafts and countershafts that can be attained in a good sectionalized electric motor drive which greatly reduces the friction losses and space required, in addition to having the advantages of all the prime movers together in the power plant where they can receive the best of attention.

Steam turbines have been used to some extent for paper machine drives, being connected through reduction gears, but owing to the comparatively small sized turbine required for paper machine, steam rates of same are extremely high, and on this account they are very undesirable for this purpose. The steam rate of same being approximately the same as the Throttling Governor, Twin, Variable Speed, steam engine.

(This article will be continued in a future issue)

Bleaching Liquor Produced from Salt and Water by Means of Low Voltage Cells

PAPER mills require a stronger bleach than textile or other mills, due to the character of the material and the great dilution by water in the beaters. Until recently no hypochlorite cell has been produced to give strong enough bleaching liquor for such purposes without the necessity of dumping the solution and running in an extra supply of bleach, which added to the time of bleaching. This difficulty has now been overcome, and there is now offered to the trade new low voltage cells, 24 of which may be operated on a 110-volt circuit, or multiples thereof, depending upon the bleach requirements.

The efficiencies attained are higher than heretofore secured, so that where power and salt can be obtained at reasonable figures, the cost of producing the hypochlorite is lower than other chlorine bleaches, particularly at the present market price of bleaching powder. As an example—if the power cost be one cent per kw., and salt cost $10 per ton, the equivalent cost for bleaching powder should be $1.50 per 100 pounds laid down in the mill. If the losses on bleaching powder are taken into consideration, such as deterioration, bursting of drums, waste in the sludge, etc., the figures will be still more favorable towards electrolytic sodium hypochlorite. Ordinarily in mill practice, it is unusual to avail oneself of more chlorine than 30 per cent of the weight of the chloride of lime. On such basis it would only require 152 pounds of salt to produce the equivalent of 100 pounds of bleaching powder. This may seem like an over statement, but it is borne out by actual tests; nor is it taking into consideration the greater efficiency of the electrolytic hypochlorite, mentioned in the first paragraph. Moreover, this 152 pounds of salt is more desirable to handle than the 100 pounds of bleaching powder, nor is there any deterioration in it. It may be stored indefinitely without loss.

Below is a summary of the advantages obtained by the use of the product from electrolytic cells:

1. It is more efficient than other chlorine bleaches.
2. If a sour is used, 25 per cent less of it is required.
3. There is no deterioration to speak of, because it can be made fresh to meet the daily requirements.
4. There is no undesirable lime sludge with which to deal.
5. More convenient to handle and make than bleaching powder solution.
6. With power and salt costs at a reasonable figure, it is cheaper.
7. A practically neutral sodium hypochlorite is produced, which possesses many advantages for bleaching purposes, particularly in regard to finished product.
8. It is an insurance against bleach shortage, because salt and electricity are always available.

Following is a general description of a typical unit for producing the equivalent of 1200 pounds of bleaching powder in 24 hours. These units may be increased in size and number to provide for greater requirements.

Low Voltage Hypochlorite Cell

The illustration shows a typical cell requiring about 4.6 volts for operation, therefore, on a 110-volt circuit, 24 of them must be wired in series. Direct current of electricity is required.

Twenty-four cells of this type will produce the equivalent of 500 pounds of bleaching powder in 10 hours' operation, including the time for filling and

emptying. Larger or smaller units can be supplied to meet the varying requirements of bleach consumption.

They are extremely simple in operation. After being filled with salt brine from a storage tank, electricity is turned on, and no further attention required until the bleaching liquor is brought up to proper strength. There is no flow of brine to be watched or regulated, nor any danger of going beyond safe temperatures.

Stoneware vitrified all the way through or other suitable material is used in the construction of the cells, in consequence of which the depreciation charges are quite within reasonable limits.

The actual floor space required for the 24 cells is about 125 square feet, a space, say 10 by 12½ feet, including the working space. It will thus be seen that the area requirements could quite readily be accommodated in most any mill, for the formulation of the cells may be in rows of 4, 6, 8 or 12, or in one straight line to suit space conditions.

The conducting graphite electrodes are the purest that can be made in an electrical furnace, but they should be replaced at intervals of six months or a year, depending upon the operating hours.

It is always recommended, where direct current of sufficient amount is not available, that a generator of larger capacity than the rating of the cells, be installed because the current runs high for a few minutes when cells are first started. In this particular unit of 24 cells, the amperage requirements are approximately 750, and the kw. requirements 83, but we recommend a generator with a rating of not less than 100 kw. to take care of initial overloads in starting cells.

One great advantage these hypochlorite cells possess over chlorine gas diaphragm cells is that they can be used intermittently or continuously without any deterioration whatever, nor do they require expert attention. Any workman of ordinary mental calibre may be utilized to handle them with safety. Furthermore, the cleaning of the cells and electrodes is a simple operation. Such work has been reduced to the lowest possible element of time and attention.

In making up the salt brine, 50 pounds of salt to 100 gallons of water are recommended. This is not a fixed concentration, but it has been found by experimentation that such proportion is about right in order to obtain the best efficiencies. No purification of the brine is required, as in other processes. This reduces investment charges and also saves time. The salt should be of a fair grade, free from any excess of calcium or magnesium.

Under normal conditions, a pound of chlorine can be produced from 5.08 pounds of salt and an electrical consumption of 2.5 kw. With salt at $10.00 per ton and electricity at ½c per kw. this would be equivalent to 35% bleaching powder laid down at the mill for $1.15 per 100 lbs.

Advantages of Pulverized Coal

MANUFACTURERS and operators of the larger coal-fired furnaces cannot afford to disregard the possible advantages of pulverizing their coal before burning it.

The principal advantages over hand and stoker firing lie in the comparative ease of conveying coal to furnaces and in the practically complete combustion of the coal, with little excess air in close contact with the material to be heated, thus avoiding the convection, radiation, and excess-air losses which accompany hand or stoker-fired furnaces placed outside reverberatory and many other furnaces. For this reason the most successful field of use of pulverized coal installations has been for those purposes where they have replaced externally fired furnaces. For purposes such as steam raising, where the burning coal can give up heat directly by radiation to the boiler heating surface, there is, therefore, less opportunity for reducing the fuel consumption by burning powdered coal instead of burning coal on a grate, since the losses which may be reduced by substituting powdered coal firing for hand firing or stoker firing are those only which are due to incomplete combustion and using excess air. Their losses, however, are not inconsiderable.

Powdered coal is better adapted for firing stationary water-tube boilers than other boilers. With these boilers, furnaces of sufficient size and of the correct shape may be constructed, and the gases pass through no tubes wherein ash may settle to obstruct the draft and shield the heating surface. It has been found difficult to burn powdered coal in locomotives and cylindrical marine boilers.

Correction in Fourdrinier Article

In the concluding installment of Mr. Weston's article on the Fourdrinier machine, which appeared in last month's PAPER INDUSTRY and in which was discussed the Harland paper machine drive, a mistake has been called to our attention.

On page 622, about half way down the right hand column, is the following statement:

"In each case the bevel pinion (Q) is driven from the cone pulley from the motor which has to be controlled. Therefore any tendency to difference in speed between the master shaft and the motor to be controlled is immediately reflected on the annular ring."

Bevel pinion (Q), referred to, will be found in the drawing on page 623.

The Harland Engineering Company ask that the above statement be revised to read as follows:

"In each case the cone pulley shaft (H) is driven by the motor to be controlled and therefore any tendency to difference of speed between the master shaft and the motor to be controlled is immediately reflected on the annular ring."

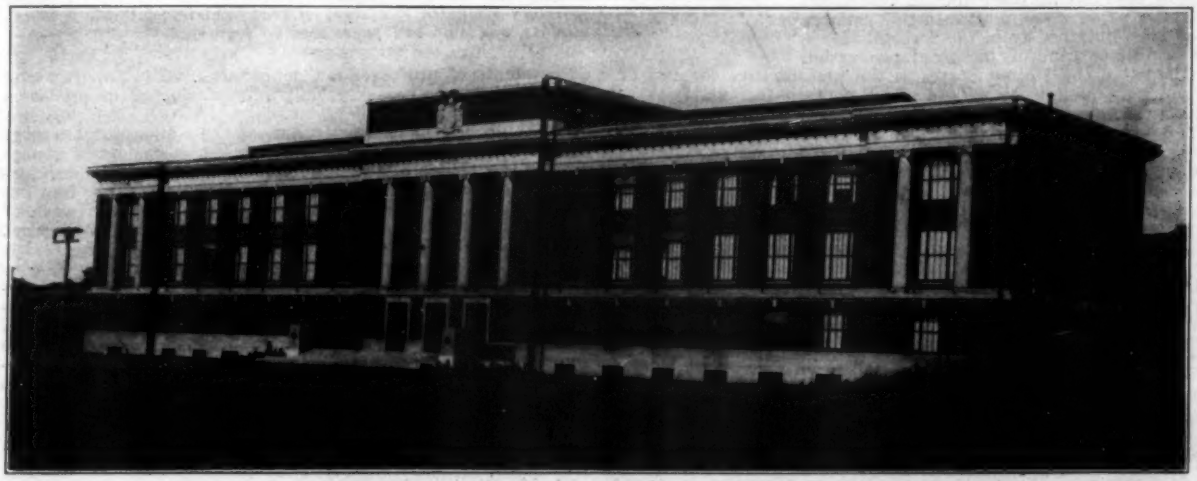
Training Technical Men for the Paper Industry

By C. E. LIBBY

Professor of Pulp and Paper Manufacture, The New York State College of Forestry, Syracuse, N. Y.

A FEW years ago a committee representing one of the organizations of the American Paper and Pulp Association made a survey of the paper industry in order to determine its requirements for technically trained men. After a careful study of the situation it was the opinion of this committee that the paper and allied industries could profitably assimilate between fifteen hundred and two thousand college trained men each year.

Notwithstanding the apparent opportunities in this field for technical men, American universities have been slow to introduce into their curricula the specialized courses necessary for training men specifically for this industry. The failure to establish such courses in the past has very probably been due to the reluctance of the colleges to depart from curricula designed to educate broadly, enabling graduates to choose a vocation in almost any field of activity. The demand of the industries for specialists has gradually brought about a modification of this idea, and many institutions of collegiate grade are now training men for individual industries. The paper industry has been one of the last to profit by this educational development, for it was not until 1913 that any American university offered organized instruction in this field. Even at the present time there are but two well established courses in the United States and Canada, although plans for others are being formulated.



Building of the New York State College of Forestry, Syracuse, N. Y.

Instruction in paper making was first given at the New York State College of Forestry in 1918. The course was organized to give regularly enrolled forestry students elementary instruction in the important field of forest utilization embraced by the paper industry. Opportunities for employment in this industry were so numerous that many students, educated primarily as foresters, were soon filling permanent positions in pulp or paper mills despite the fact that their training had not been designed to fit them for this work. To meet this situation, in the fall of 1920 the pulp and paper courses of the college were reorganized with the object of training interested students specifically for the pulp and paper industry.

The New York State College of Forestry is possessed of an ideal location for a school of papermaking. Not only is New York State the leading state in the number of its pulp and paper establishments, but also in the number of people engaged in the industry and in the production and value of its manufactured products. These factors assure the college of active cooperation on the part of the industry in furnishing to its students opportunities for plant experience and in placing its graduates. Within a radius of thirty-five miles of the college are located more than a score of pulp and paper mills, while the Black River district, famous for its pulp and paper establishments, is easily accessible. These mills offer exceptional opportunities to students for trips of inspection and plant operating experience. The convenience of its location makes it possible to develop a keen professional spirit among the students of the college, since prominent men in the industry frequently visit it, acting as special lecturers on particular phases of the work, and since students may readily attend the conventions of the industry in New York City or elsewhere in the State at small expense.

Laboratories and Equipment

The New York State College of Forestry, as its name implies, is a state institution, its building having been erected in 1917 on the campus of Syracuse University, at a cost of $250,000. This plant represents the largest and best equipped forestry school in America. The pulp and paper laboratories are located in the basement of the building and occupy approximately 5,000 square feet of floor space. These laboratories consist of a general chemical laboratory, semi-commercial pulp and paper laboratory, paper testing laboratory, color laboratory, and research laboratory. A desirable feature of the organization of the college is its arrangement with Syracuse University whereby all elementary courses such as general chemistry, qualitative and quantitative analysis, etc., are given in the laboratories of the university. This arrangement enables the college to devote its own laboratories exclusively to the specialized work of its departments, giving instruction only to advanced and graduate students. The pulp and paper laboratories of the college are well equipped with approved testing devices and semi-commercial equipment. The experimental pulp mill includes a Mitscherlich sulphite digester, a rotary soda and sulphate digester, diaphragm screen, stock vats, and a rotary steam dryer. The semi-commercial paper mill includes a 15 pound Jones beater equipped with a drum washer, a Noble and Wood Jordan engine, Gould centrifugal pump, Rice Barton and Fales wet machine, Harmon diaphragm screen, sheet machine and hand moulds. The paper testing laboratory has a complete equipment of the Schopper physical testing instruments, together with the common domestic physical and chemical apparatus for measuring physical strengths, determining fiber compositions and making chemical analyses. The color laboratory is equipped for determining dyestuff strengths, matching shades, or preparing formulas for colored specialties. Several of the large dystuff manufacturers assisted in organizing the work of this laboratory by presenting to the college complete samples of their dyestuffs that are used in coloring paper.

Library Facilities

The library of the college contains approximately 5,000

volumes and 10,000 pamphlets dealing exclusively with the various phases of forestry and among which may be found most publications pertaining to the pulp and paper industry. The Syracuse University library contains 135,000 volumes and 65,000 pamphlets comprising collections of books on the sciences, history, economics, languages and engineering. In the Syracuse Public Library there are 165,000 volumes, and many additional thousands of pamphlets and current periodicals. These combined library resources are at the disposal of pulp and paper students, thereby affording excellent reference facilities and a proper background for research.

Plan and Scope of the Curriculum

The development of a pulp and paper curriculum at a school of forestry represents a departure in technical education in this country. Heretofore all courses of this nature have been developed in connection with the departments of chemical engineering in engineering colleges. There appears to be no reason, however, why such a course should not be based upon the curriculum of a professional forestry course, especially if the forestry school is so located that the necessary accessory courses in chemistry and engineering can be obtained readily. In many ways the forestry curriculum provides the most logical foundation for this course.

For many years the principal raw material for paper manufacture in this country has been obtained from the forests. More than 75 per cent of the total production of paper in the United States at the present time consists of wood pulp papers, or papers which contain this material as the predominating fiber constituent. Since the production of paper in the United States is approximately 7,000,000 tons annually, there is an enormous drain on our forests to supply the necessary raw material. The present rate of consumption of certain kinds of timber like spruce is so great that they will almost disappear as commercial species within the next twenty-five years. This situation does not mean that wood-pulp will soon disappear as a raw material for papermaking, but rather that forest species more difficult to utilize and now considered unfit for pulping will gradually come into use. Fractions of the industry will probably be able to continue with their present raw materials if they adopt scientific measures in reproducing and utilizing their forests.

Since wood pulp is likely to remain a raw material of major importance in the manufacture of paper, it is desirable that the education of a technical man for this industry should include a general knowledge of conservation and forest economics, and a fundamental technical knowledge of the principal raw materials of the industry. A man with this training, coupled with experience in the technical processes of the industry, should have a clearer vision in meeting future re-

General Chemical Laboratory—Devoted to a study of the chemistry of forest products, cellulose, and pulp and paper making processes

adjustments of processes and materials used in papermaking than the man who possesses only a knowledge of the processes themselves.

The pulp and paper curriculum of the College of Forestry is projected with this idea of giving the student a fundamental knowledge of the economic aspects and technical features of his raw materials. Experience indicates that in order to accomplish this not less than 20 per cent of the work of the course must be devoted to a study of elementary forestry, botany, wood technology, cellulose and fibre chemistry.

While the manufacture of pulp and paper cannot be considered a chemical industry, so many of the operations involve chemical processes that the training of a paper technologist would be incomplete without a thorough knowledge of this science. Approximately 20 per cent of the work of the pulp and paper curriculum consists of courses in pure chemistry, while fully 50 per cent of the 29 credit hours devoted to

Semi-Commercial Paper Laboratory—Training students of the four year pulp and paper course to operate a modern paper mill

pulp and paper manufacture consist of technological chemistry applied to the specific processes of the paper industry.

The engineering problems associated with the manufacture of pulp and paper are perhaps more varied and extensive than those of the average big industry. A technical man in the mill should have a good elementary knowledge of electrical and mechanical engineering especially with relation to power plant problems. This work is presented in the college curriculum during the Senior Year. Preparatory courses in mathematics, physics and mechanical drawing precede the courses in electrical and mechanical engineering. Altogether these courses account for another 20 per cent of the total work of the four year program.

Experimental Pulp Mill—This equipment reduces wood to pulp by any one of the chemical pulp processes

Society has a right to expect of the college man a certain degree of culture, no matter how technical may have been his education. His value to the community depends not only upon his technical ability, but upon his understanding of human relationships, the exercise of his rights and duties as a citizen, and an appreciation of the arts. It is hardly possible for a professional curriculum to develop such phases of education to maturity, but it should stimulate an interest in them. Courses in English and foreign languages, public speaking, elementary and advanced economics, and business law attempt to develop this interest in the work of the pulp and paper curriculum. These courses comprise 15 per cent of the total work of the program.

Pulp and Paper Courses

Specialization in pulp and paper technology is not attempted during the first two years of the pulp and paper course, since this work requires as a pre-requisite the courses in mathematics, physics and chemistry as well as the elementary work in forestry, botany and wood technology. At the beginning of the Junior year the student is given intensive instruction in papermaking. Approximately 20 per cent of the total work of the course is devoted to this subject. The work is divided into ten distinct courses, an abbreviated description of each course being presented herewith:

I—Technology—108 hours' lecture work on raw materials, the pulp making processes, bleaching, beating, sizing, loading and coloring.

II—Technology Laboratory—216 hours' laboratory work devoted to experimental demonstrations of the process described in Course I.

III—Machinery—108 hours' lecture work on the location and design of pulp and paper mills and on the construction and operation of pulp and paper mill machinery.

IV—Mill Analyses—108 hours' laboratory work devoted to the preparation and analysis of chemical solutions to be used in the experimental pulp and paper mill described in Course II, and to the analysis of recovered chemical products resulting from the operation of this mill.

V—Paper Testing—108 hours' laboratory work devoted to the physical, chemical and microscopical examination of papers and fibre mixtures.

VI—Pulp Testing—54 hours' laboratory work devoted to the testing of pulps for freeness, color, strength, bleach consumption, overbleaching, etc.

VII—Coloring—108 hours' laboratory work devoted to the identification and strength testing of dyestuffs, the shade matching of colors on paper stocks, and the preparation and application of mottling fibers, color lakes, etc.

VIII—Mill Organization—36 hours' lecture work on type organizations, administration, cost systems, mill records, job analyses, accident prevention, factory hygiene and the merchandising of papers.

IX—Problem—54 hours' library work reviewing all available literature on some problem of interest to the pulp and paper industry, and in the preparation of a report on this investigation outlining laboratory work to be undertaken on some phase of the problem.

X—Problem — 162 hours' laboratory work devoted to experimental work on the problem studied in Course IX, and in the preparation of a report on the results of this original investigation.

Summer Employment

Each student at the College of Forestry who majors in the work of the pulp and paper course is required to spend at least six months in a pulp or paper mill as a pre-requisite for graduation. The time of employment is optional with the student, but it is usually distributed between the last two summer vacation periods. A comprehensive, carefully written report, describing the experience of the student, must be presented and approved by the college before credit will be allowed for this practical experience requirement.

The college attempts to locate mills for its students where practical experience may be obtained. These mills accept the students as laborers and they are put to work in any part of the mill where needed and are usually paid the going rate of wages for the class of work they perform. The cordial attitude of the New York State mills as well as those of neighboring states in assisting the college to place its students has been very gratifying. In several instances, mills have stated definitely that these summer jobs really acted as probationary terms of employment and that the students could rely on receiving permanent employment after graduation if their temporary services proved to be satisfactory.

Paper Testing Laboratory—Revealing the physical, chemical and microscopical properties of paper

Graduate Work

The college offers graduate work in all its departments including that of the pulp and paper division. However, the college will not grant a degree to anyone who does not possess at least a general knowledge of forestry. Graduates of other institutions who have not had instruction in general

forestry may be recommended for the degree of Master of Science on the completion of one year of satisfactory residence work, providing they have at least one minor credit in forestry. A minor credit consists of six credit hours. Since thirty credit hours constitute the minimum requirement for a Master's degree, the major work of the graduate student, completing his credits, may be elected from the work of

Color Laboratory—The technique of selecting dyes for coloring paper is acquired by students in this laboratory

the department of the college in which he is most interested.

The Hammermill Paper Co., through their Chemical Director, Dr. Bjarne Johnsen, have established at the college a fellowship for the coming year (September 1923-1924) to be known as the "Hammermill Fellowship in Pulp and Paper Manufacturing." The fellowship carries a grant of $1200 to the recipient, who must be a graduate student at the college, his work leading to the degree of M.S. Mr. Burton L. Kassing, 105 Grove Place, Utica, N. Y., a member of the 1923 graduating class at the college, has been designated by the company and the college as the recipient of this signal honor.

SYNOPSIS OF COURSES

Pulp and Paper Curriculum

FRESHMAN YEAR

First Semester	Hours	Second Semester	Hours
Elementary Forestry	2	Forest Zoology I	3
English I	3	English I	3
Forest Botany I	3	Forest Botany II	4
German I or VI	3	German I or VI	3
Chemistry I	3	Chemistry I	3
Math. I, Trigonometry	3		
	17		16

SOPHOMORE YEAR

	Hours		Hours
Wood Technology I	5	Wood Technology I	3
Physics I	4	Physics I	4
Chem. III, Qualitative	3	Chem. III, Qualitative	3
Mechanical Drawing IV	2	Mechanical Drawing V	2
Math. II, Algebra	3	Math. III, Analytics	3
	17	English II	3
			18

THREE MONTHS' WORK IN A PULP OR PAPER MILL

JUNIOR YEAR

	Hours		Hours
Rhetoric XV, Public Speaking	3	Economics I	3
Forest Chem. II, Organic	3	Forest Chem. II, Organic	3
Chem. 104, Quantitative	3	Chem. 104, Quantitative	3
Pulp & Paper Mfg. I, Technology	3	Pulp & Paper Mfg. I, Technology	3
Pulp & Paper Mfg. II, Laboratory	2	Pulp & Paper Mfg. III, Machinery	3
Pulp & Paper Mfg. III, Machinery	3	Pulp & Paper Mfg. V, Paper Testing	2
Pulp & Paper Mfg. IV, Mill Analyses	2		
	19		19

THREE MONTHS, WORK IN A PULP OR PAPER MILL

SENIOR YEAR

	Hours
Electrical Engineering	5
Wood Technology III	3
Business Law I	2
Forest Chem. III, Cellulose	3
Economics VII	3
Pulp & Paper Mfg. VI, Pulp Testing	1
Pulp & Paper Mfg. IX, Problem	1
	18

	Hours
Mechanical Engineering	5
Paper Making Fibers	3
Business Law I	2
Pulp & Paper Mfg. VIII, Organization	2
Pulp & Paper Mfg. VII, Coloring	2
Pulp & Paper Mfg. X, Problem	3
	17

The Ruhr Occupation and Germany's Forests

Almost immediately following the French occupation of the Ruhr came a slump in the German saw-mill industry. French and Belgian orders for wood goods were cancelled, reports O. M. Porter, Secretary-Treasurer of the Woodlands Section of the American Paper & Pulp Association, who bases his statements on correspondence from a German representative. He says large supplies of ties, telegraph poles and other timber products, cut according to the peculiar French and Belgian specifications, are now piled in the state forests with no market. "The situation is interesting," says Mr. Porter, "in that the French occupied the Ruhr ostensibly because Germany failed to deliver adequate quantities of telephone poles and railroad ties. The Germans claim that it is difficult, or impossible, to meet the French reparation demands in that state, whose individual and town forest owners are loath to accept the gold reparation prices imposed by the French.

"The French have taken possession of the state forests of Bavaria, Hessen, Prussia and Oldenburg; an aggregate probably of a million and a quarter acres, more than half of which contains little more than fuel wood. It is difficult for the French to obtain German forest labor and the German timber firms do not attend their auctions of woods goods. The French have occupied the Bavarian Palatinate just north of Alsace, which contains the oldest stand of planted white pine on earth, the seeds of which were brought over by a Hessian officer, Baron Von Haake, who fought against Washington. It might be said that he returned with a wreath of pine cones, rather than laurel leaves.

"The German forests were not over-cut during the war, and are not being over-cut at present. However, through the careful calculations of German forest finance, of maximum soil expectation value, of short rotations and full utilization of early thinnings, of spruce being given the preference over other species, these are being discarded in favor of natural regeneration and rotation of crops and elimination, in so far as possible, of clear cutting."

Mr. Porter included a table in his report which showed that Germany now has about 204,000,000 cords of spruce located in six different states. Of this less than 3,000,000 cores are being cut annually, while at least 4,500,000 cords are considered the present annual potential productive capacity of these spruce lands. Commenting on the lack of market for the ties and telephone poles as mentioned by his correspondent, Mr. Porter says this is difficult to understand since there is a very real fuel famine in Germany, due to the coal famine occasioned by the loss of the coal fields of Silesia, the Saar and the Ruhr. He adds, German imports of pulpwood are increasing with large supplies coming from Czecho-Slovakia.

Shartle Triples Capacity Within Year

SOME 35 or 40 years ago a young machinist looking for a job, wandered into the office of the Middletown Machine Company, Middletown, O. He found what he was looking for and worked there a number of years. And in about 1890, a few years later, the Middletown Machine Company told "Charlie" Shartle that they "would no longer need his services."

This little incident takes on considerable interest in view of the fact that within the past few weeks the company of which "Charlie" Shartle is now the head has acquired a controlling interest in the Middletown Machine Co. A few short years ago they fired him and now he is the "Big Boss."

The acquisition of this new plant practically doubles the capacity of the Shartle Bros. Machine Co. It includes about five acres of land on which is a brick building measuring 60 by 400 feet. The shop is typical of factory buildings in this part of Ohio, with a luxuriant growth of ivy blanketing the front of the office and straggling at random for a distance along the side walls. Included in the sale were from 75 to 100 tools—lathes, planers, drills, etc., all seemingly in first class condition.

To realize the great need of immediate and extensive expansion to their present manufacturing facilities one needs only to glance through their present shops. So crowded is everything, so close together are operations that one wonders at the remarkable production records made by this concern. One also realizes the vast growth made by this company in the past few years. It was only a short time ago when Shartle Brothers' reputation (very limited indeed) was based on their ability to rebuild and repair paper mill machinery. The variety and great amount of manufacturing going on in their shops today is concrete evidence of their national reputation as high grade paper machinery manufacturers.

The purpose of the newly purchased plant is therefore to relieve the congestion of their present shops. This will, of course, greatly increase the efficiency of operations.

Since the tools in the new factory are largely adapted to fine work, the present shops will be devoted almost entirely to the heavier and bigger jobs while the smaller work and specialties will be handled at the other place. Here also will their Bulldog fillers be made.

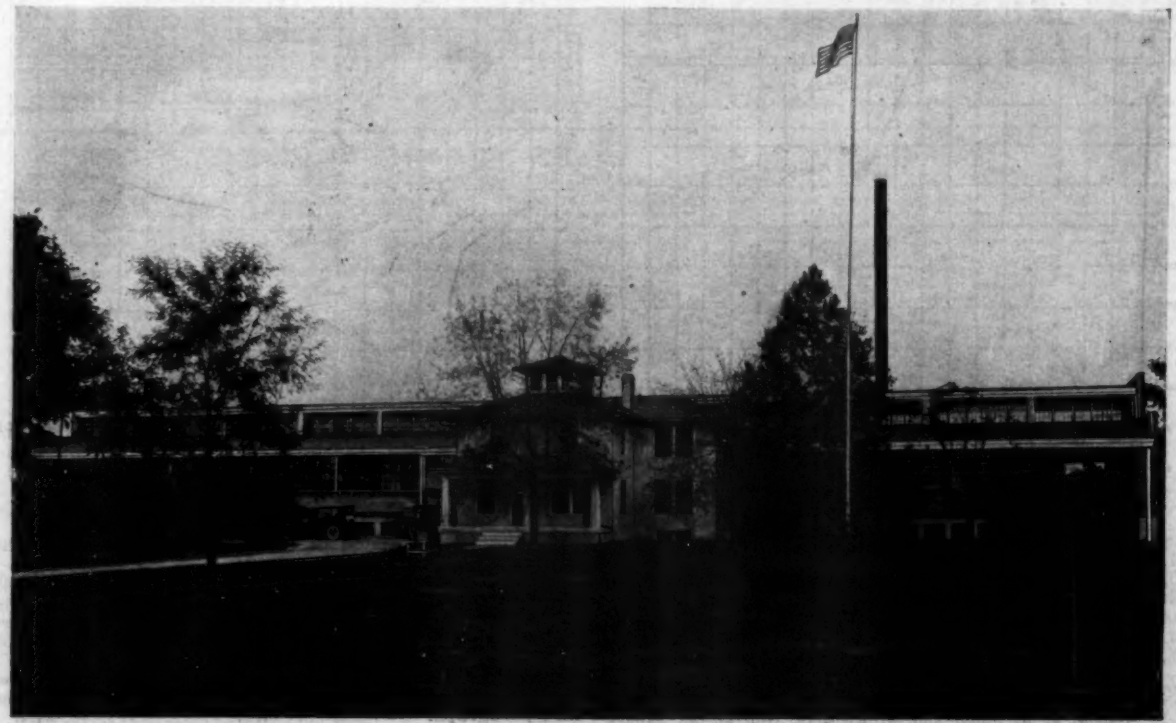
A new addition to their present plant has just been finished and the foundation is now being laid for another. It is estimated that with these two new additions and the plant of the Middleown Machine Co., their manufacturing facilities will have been practically tripled, and this within a year. Their total working force will be about 250 men.

The original shop and "force" of the Shartle Bros. Machine Co. Charles W. Shartle is to be seen at extreme left.

Standardization of every operation is the ultimate aim of the company.

After a trip through their combined properties you undoubtedly would ask as we did, "What is the cause of this seeming sudden growth?" You undoubtedly would be told as we were told that it was not a sudden growth. You would be told that it was simply the result of years of hard conscientious work that is just now coming to the surface, as it were.

After all, isn't that the basis of all genuine success?



Front view of the present plant of the Shartle Bros. Machine Co. This gives but a little idea of the magnitude of their manufacturing space.

The Influence of Sulphur in the Cooking of Jack Pine by the Sulphate Process*

By SYDNEY D. WELLS

Engineer in Forest Products, Forest Products Laboratory, Madison, Wisconsin

IN THE first of a series of papers on the chemistry of the alkaline process for pulping[1] it was shown in what way the chemical composition of the pulps and of the cooking liquors and the bleaching qualities and paper making qualities of the pulps were affected by the length of the cooking operation. The work has been extended to the consideration of sulphate cooking and the investigation of the first series of cooks recently completed.

Experimental Procedure

In the series under consideration the cooking conditions were as near as possible the same as those in the soda series referred to, except for the addition of sulphur. These conditions were as follows:

1. Charge of chips, 100 lbs., bone dry weight.
2. Caustic soda, 20 lbs.
3. Volume of cooking liquor at beginning of cook, 20 gallons.
4. Time in reaching maximum temperature, 1 hour.
5. Maximum temperature, 170° C., corresponding to a steam pressure of 100 lbs. per sq. in. above atmospheric pressure.
6. The chips were all thoroughly impregnated with caustic soda solution, using the same methods outlined in the soda series.
7. In order to obtain the effect of sulphate cooking and at the same time avoid the difficulties in controlling the chemical composition of liquors containing sulphur compounds, two pounds of ground sulphur were added to the digester immediately after the impregnation period and before cooking was commenced. Assurance was thus gained that each cook would contain 20 pounds of caustic soda and two pounds of sulphur and under similar conditions the resulting sulphides and thiosulphates would be the same in proportion to the caustic soda.
8. The cooks were blown after periods of 40, 70, 105, 150, 173, 246 minutes, respectively, and by completely analyzing the black liquors and pulps so obtained the same results were secured as if accurate samples had been taken from one cook at the intervals mentioned.

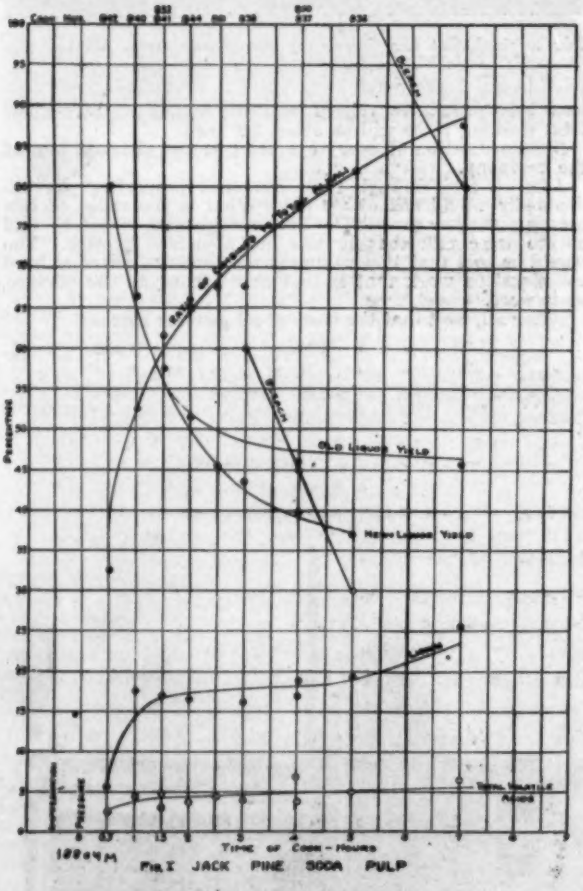


Fig. I JACK PINE SODA PULP

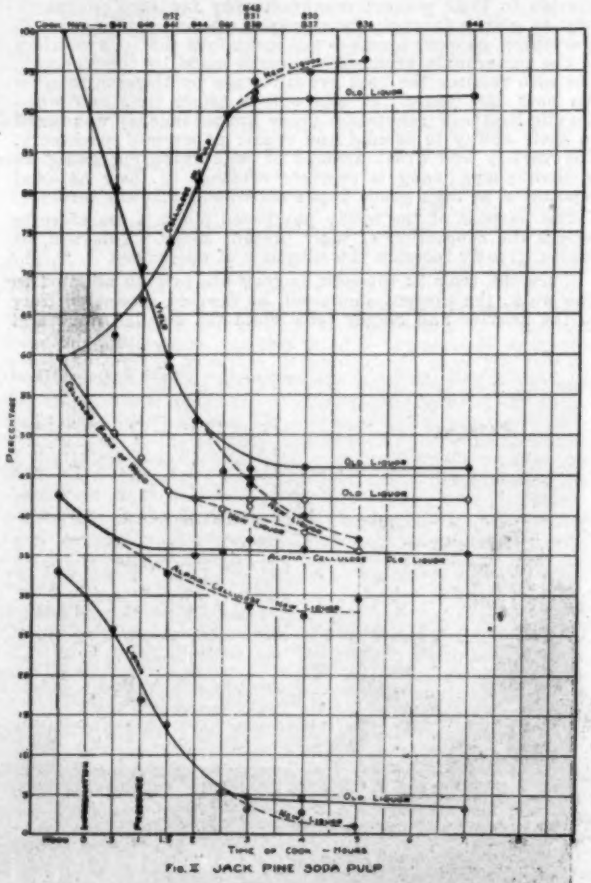


Fig. II JACK PINE SODA PULP

The analytical methods used and the paper making and testing procedure are given in the paper referred to in the first paragraph.

Table 1 contains the complete cooking data of the sulphur soda cooks. The results of the beating tests obtained, using the ball mill method, are given in Table 2. The results of the black liquor analyses are given in Table 3, and Table 4 gives

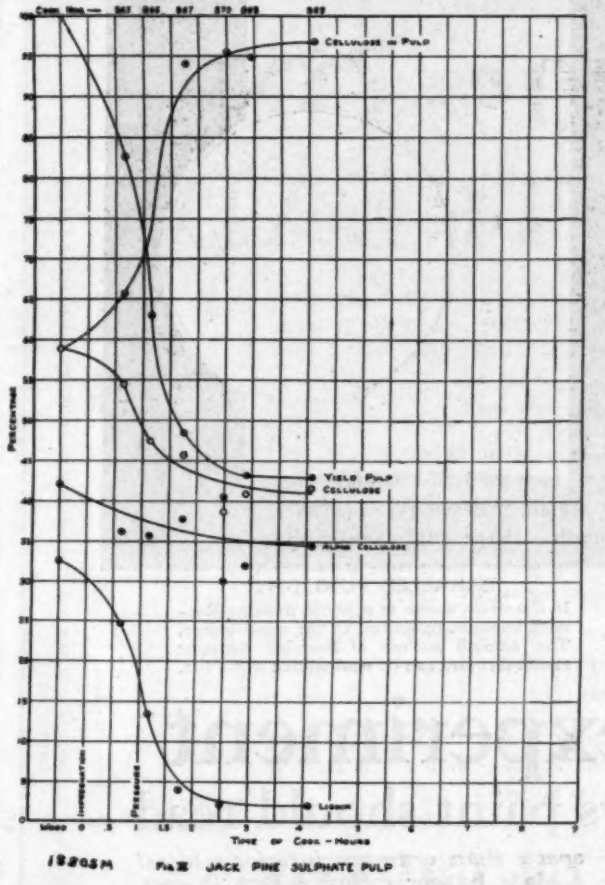
[1] The Chemistry of the Alkaline Wood Pulp Process. I. Aspen, Loblolly Pine and Jack Pine by the Soda Process, by S. D. Wells, R. H. Grabow, J. A. Staidl and M. W. Bray, read at the Annual Meeting of the T. A. P. P. I., New York, April 12, 1923.

*Paper read before the Holyoke-Springfield Convention of the American Pulp and Paper Mill Superintendents' Association, at Hotel Kimball, Springfield, Mass., June 1, 1923.

the results of the chemical studies on the pulps. In Figure 1 are plotted the results of the chemical studies of the black liquors from the paper referred to and Figure 2 the results of the chemical studies of the pulps. Only the curves showing the results obtained with old liquors should be considered in this paper, since the others were obtained under conditions not comparable. In Figure 4 the results of the chemical studies on the black liquors of the sulphur-soda series are given and in Figure 3 the studies of the pulps.

Physical Properties of the Pulps

In comparing the ball mill tests of the soda pulps from jack pine with the sulphur-soda pulps, the action of the sul-



1920SM FIG 3 JACK PINE SULPHATE PULP

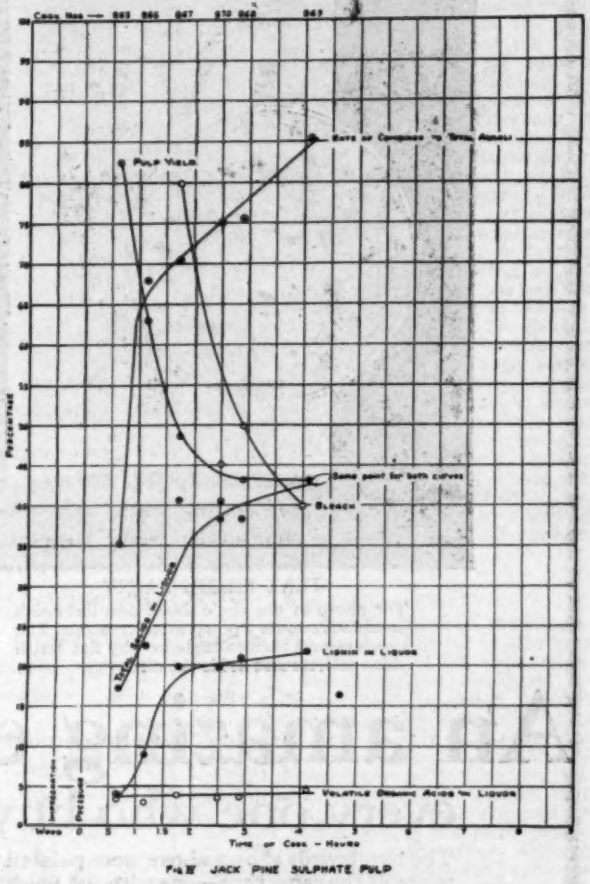


FIG 4 JACK PINE SULPHATE PULP

TABLE NO. II

BEATING DATA ON JACK PINE PULPS

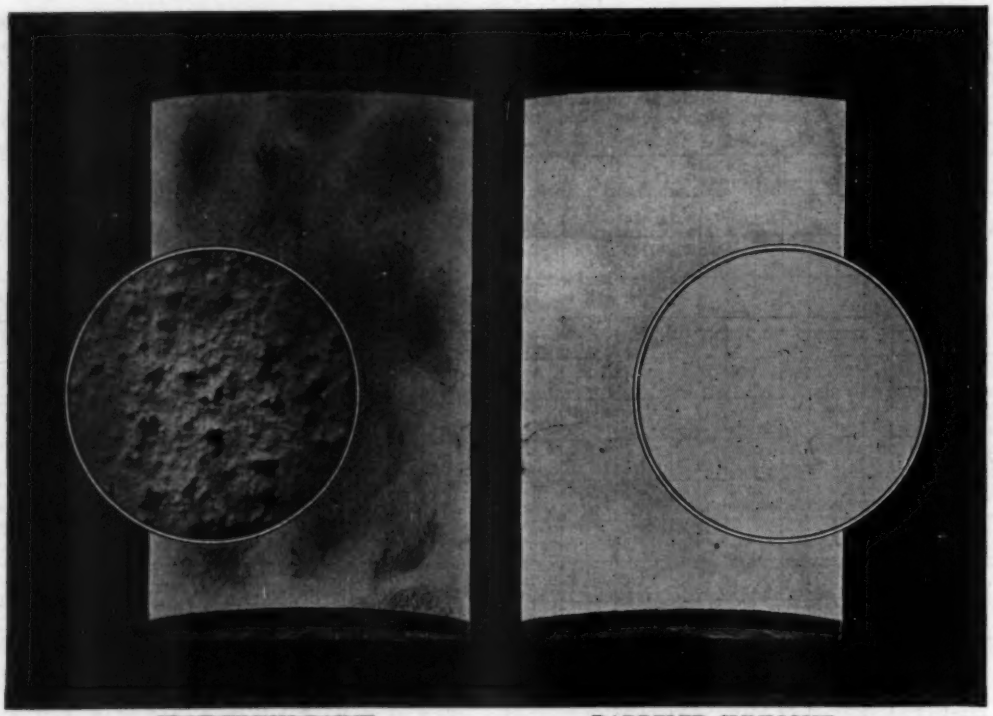
Pop test expressed in points, per pound, tearing test in grams, tensile test in meters (breaking length) and folding test in double folds.

Test	Pop test		Tearing		Tensile		Folding	
Process	Soda	Sulphur Soda	Soda	Sulphur Soda	Soda	Sulphur Soda	Soda	Sulphur Soda
Cook No.	848	870	848	870	848	870	848	870
Duration of cook (hours)	3	2½	3	2½	3	2½	3	2½
Beating time to maximum test (minutes)	80	100	100	100	120	80	100	100
Maximum test	.81	1.11	174	214	3500	3600	220	1776
Cook No.	850	868	850	868	850	868	850	868
Duration of cook (hours)	4	3	4	3	4	3	4	3
Beating time to maximum test (minutes)	140	80	140	40	140	60	120	80
Maximum test	.87	.90	177	217	3700	3900	390	1953
Cook No.	846	869	846	869	846	869	846	869
Duration of cook (hours)	7	4	7	4	7	4	7	4
Beating time to maximum test (minutes)	100	100	100	80	80	80	80	100
Maximum test	.91	1.05	185	211	4100	5170	530	2373

TABLE NO. IV

JACK PINE SULPHATE SERIES

Cook No.	Time of cook	Results calculated on basis of oven-dry wood								Results calculated on basis of oven-dry pulp
		Yield O. D. wt.	Hot H_2O Sol.	Alk. sol. (Corr.)	Lignin	Cellulose	Alpha Cellulose	Beta Cellulose	Gamma Cellulose	Cellulose
	Hrs. or minutes	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Wood	0	100.0	3.1	9.9	32.65	58.9	42.2	0.0	15.5	58.9
865-A	40	82.75	3.5	2.5	24.8	54.6	36.3	0.0	15.7	65.9
866	70	63.0	1.3	2.6	18.5	47.4	35.7	0.0	12.2	75.2
867	105	48.6	0.4	1.1	4.0	45.8	37.8	0.0	7.3	94.1
870	150	40.55	0.2	1.0	2.1	38.6	30.0	0.0	6.7	95.1
868	173	43.2	0.2	1.2	2.5	41.0	32.0	0.0	7.0	94.9
869	246	43.03	0.0	1.0	2.0	41.6	34.4	0.0	7.0	96.8



FLAT FINISH PAINT

The photo in the circle shows how flat finish paint looks under a powerful microscope. The rough porous surface explains why flat finish paint collects and holds the dirt.

BARRELED SUNLIGHT

In the circle above is a photo showing Barreled Sunlight magnified to the same degree. The smooth surface of Barreled Sunlight resists dirt and can be washed like white tile.

An amazing experiment

every one who buys paint should read

The two boards shown above were painted white at the same time—one with flat finish white paint, the other with Barreled Sunlight. They were given an equal amount of handling for a week—then photographed.

Notice the result!

It shows clearly why Barreled Sunlight is used today in leading paper mills throughout the country.

Barreled Sunlight produces a surface so smooth that it resists the finest particles of dust and dirt! A surface that even under a high-powered microscope is shown to be absolutely even and unbroken.

This smooth, lustrous surface means mill interiors that *remain* white without frequent repainting. It means walls that can be washed like white tile—even after years of service.

Furthermore, actual tests prove that Barreled Sunlight *costs less per square foot of wall space than ordinary interior whites!*

Made by our exclusive Rice Process, Barreled Sunlight is guaranteed to remain white longer than any gloss paint or enamel, domestic or foreign, applied under the same conditions.

Flows freely and may be applied by brush or spray. Will not chip or scale. Where more than one coat is required, use Barreled Sunlight Undercoat.

Sold in barrels and in cans. Send for our booklet, "More Light."

For heater rooms and places where excessive fumes prevail, Chemic Enamel, a special form of Barreled Sunlight, is recommended. This is smooth and washable, also.

U. S. GUTTA PERCHA PAINT CO.

Factory and main offices
31 DUDLEY ST. PROVIDENCE, R. I.

New York—350 Madison Ave.
Chicago—659 Washington Blvd.
San Francisco—38 O'Farrell Street
And 100 other distributing points in the U. S. A.

"Save the surface and you save all"

Barreled Sunlight

THE RICE PROCESS WHITE

TABLE NO. I.

Cooking data of sulphur-soda cooks on jack pine wood. Impregnation, 30 minutes—110 lbs. pressure—cooking temperature, 170° C.

Cook No.	Time to maximum temperature Minutes	Chips				Impregnating liquor					Cooking liquor								Bleach required 30% available chlorine per 100 lbs. oven-dry pulp
		Time at maximum temperature	Weight of wet chips	Moisture	Oven dry weight	Volume of impregnating liquor	Volume of return liquor	Difference	NaOH in impregnating liquor	NaOH in return liquor	Difference	NaOH in impregnating liquor	NaOH in return liquor	Difference or NaOH used in cook	Gallons of liquor	Concentration of NaOH	Sulphur added	Volume of black liquor at end of cook	Yield of pulp	Ratio of free to total alkali at end of cook	
	Minutes	Lbs.	%	Lbs.	Gals.	Gals.	Gals.	GPL	GPL	GPL	Lbs.	Lbs.	Lbs.	Gals.	GPL	Lbs.	Gals.	Lbs.	%	Percent
865-A	(to 120° C.)	...	120.2	11.60	100.2	60.9	40.6	20.3	92.1	76.2	15.9	46.80	25.50	21.3	21.98	125.7	2.0	35.2	82.75	35.1	0.486 lbs. sulphur unconsumed
866-A	40	0	112.8	11.49	100.0	65.1	50.1	15.0	98.6	80.2	18.4	53.50	33.50	20.0	20.00	120.0	2.0	28.0	83.00	65.3	
867-A	70	45	112.1	10.93	100.0	66.8	48.4	18.4	95.6	82.4	13.2	53.25	33.25	20.0	20.00	120.0	2.0	38.0	48.6	70.45	Bleached more than 80%
870-A	60	90	113.2	11.64	100.0	67.45	50.1	17.35	102.6	90.4	12.4	57.65	37.65	20.0	20.00	120.0	2.0	37.0	40.55	73.4	Bleached at 45%
868-A	85	83	113.7	12.12	100.0	65.40	46.35	19.05	98.4	87.0	11.4	53.60	33.60	20.0	30.00	80.0	2.0	49.0	43.20	75.67	Bleached more than 50%
869-A	70	175	112.8	11.42	100.0	65.8	48.0	17.8	98.6	85.0	13.6	54.00	34.00	20.0	20.00	120.0	2.0	42.5	43.03	85.43	Bleached at 40%
871-A	60	180	115.3	13.4	100.0	68.3	54.5	13.8	104.0	86.5	17.5	59.3	39.3	20.0	25.00	96.0	2.0	....	46.80	87.0	

TABLE NO. III

RESULTS OF ANALYSIS OF SULPHATE BLACK LIQUORS—JACK PINE

Cook Number	Total time of cook Min.	Volume of impregnation liquor Liters	Volume of impreg. liquor returned Liters	Volume of bl. liquor at end of cook Liters	Lignin in impregnation liquor g.p.l.	Lignin in return liquor g.p.l.	Lignin in impregnation liquor Pounds	Lignin in return liquor Pounds	Lignin added to cook Pounds	Lignin in bl. liquor of cook g.p.l.	Lignin in bl. liquor of cook Pounds	Lignin obtained corrected Pounds	Total solids in bl. liquor g.p.l.	Total solids in bl. liquor Pounds	Organic acids in black liquor g.p.l.	Organic acids in black liquor Pounds	Ratio of combined to total alkali Percent	Pulp yield Percent
865-A	40	230.0	183.4	133.0	3.0	4.1	1.5	1.3	0.2	12.4	3.6	3.4	58.4	17.1	14.48	4.2	35.1	82.7
866-A	70	246.0	189.2	105.8	3.1	3.6	1.6	1.5	0.1	39.0	9.1	8.0	96.7	22.5	12.90	3.0	65.3	63.0
867-A	105	252.8	186.8	143.5	4.3	2.7	2.4	1.1	1.3	66.9	21.2	19.9	126.1	40.6	12.55	3.9	70.4	48.6
870-A	150	255.0	189.4	140.8	1.7	1.9	1.0	0.8	0.2	64.9	20.6	19.8	130.9	41.3	11.70	3.6	73.4	40.5
868-A	173	247.2	175.0	185.2	2.4	3.6	1.3	1.4	0.1	51.2	20.9	21.0	91.3	37.3	9.07	3.7	75.6	43.2
869-A	246	248.8	181.4	160.6	2.8	3.3	1.5	1.3	0.2	62.0	21.9	21.7	122.0	43.2	12.62	4.5	85.4	43.0

phur is very striking. This is particularly true in studying the folding tests. The maximum folding value for cook 846 of the soda series, the cook giving the highest value, was 530 double folds, while cook 869, the best of the sulphur-soda series, gave a folding value of 2,373. In the latter case the pulp took 100 minutes to bring out the folding characteristics against 80 minutes for the best soda pulp, indicating the greater durability and toughness of the sulphur-soda pulp. The difference in tensile strength was not so marked, the maximum for the sulphur-soda series being 5,170 meters breaking length, against 4,100 meters for the soda series. Both required 80 minutes to bring up the maximum tensile test. The sulphur-soda series show an improvement in tearing qualities, the maximum tearing at 217 grams against 185 grams as the best for the other series. In the case of the Ashcroft test, the highest value for the sulphur-soda series was 1.11 points per pound against .91 for the soda series. We can hereby see that in every test the presence of sulphur has brought about increased value and it is especially true of the tests which indicate toughness in paper, such as the folding and tearing. By cooking up to the maximum time employed in the series with but small excess of alkali, the physical condition of the pulps of both the soda and sulphur-soda cooks are improved.

Bleachability of the Pulps

The influence of sulphur on the bleachability of the pulps obtained is also very marked. In the case of the soda series, cook 846 was the easiest bleaching, requiring 80 per cent bleaching powder, while 869 of the sulphur-soda series only required 40 per cent. In each series the bleach consumption decreased with increased thoroughness of cooking, but the sulphur-soda series cooks required half or less than half the bleach required by the soda series, giving the same yields. Results obtained with aspen indicate that had the cooking been continued for longer periods, coloring matter would probably have been reabsorbed from the liquor and the bleach requirements increased.

Chemical Properties of the Pulps and Liquor

The chemical tests on both the black liquors and the pulps do not show as marked differences as are exhibited in the beating and bleaching tests. In the case of the black liquors the amounts of volatile acids, such as acetic and formic acids, contained in the black liquor are about the same. In the case of the sulphur-soda series, however, the formation of these acids seems to be quicker and a maximum content of 4.5 per cent is reached at the end of the first half hour, while in the soda series one hour was required to reach approximately the same point. The rate of increase in the solution of lignin is slower in the sulphur-soda series, one hour and a half is taken to reach the point where the rate slacks off, instead of one hour as is the case in the soda series. The maximum lignin at the end of the curve in the case of the sulphur-soda series, however, was 2.2 per cent instead of 1.9 per cent at the end of an equal duration of time in the soda series. With prolonged cooking, however, the lignin content in the soda series increased further. The increase in total solids is typical of any of the alkaline cooks and there is nothing particularly unique in the curve.

Board Manufacturers ATTENTION!

What the Murphy Continuous Beating System *will do for* You

1. On most grades of board all foreign matter is eliminated in the main breaker beater.
2. The stock in the chests may be handled by centrifugal instead of plunger type pumps, which means a saving in initial expense, power and space.
3. The Murphy system permits an actual refinement of stock which relieves the load on the Jordans and saves in power.
4. It eliminates much wear and tear on the agitator equipment and saves cleaning time.
5. It means greater production, a saving in the amount of equipment required, in power, help and floor space.

Write for more information regarding Breaker Beaters with continuous attachment and Murphy Continuous Beating Systems.

Valley Iron Works Company

Plant: Appleton, Wis. **New York Office: 350 Madison Ave**

Builders of Heavy Duty Beating Engines and Agitator Equipment, Stuff and Centrifugal Pumps, Murphy Stock Regulators and Shower Pipes Especially Designed for Board Mill Use

The rate of reduction in lignin content of the pulps is slightly slower at first in the sulphur-soda series, although at the end of one-half hour the rate of removal is much faster and at 2½ hours practically completed. At the end of 4 hours the lignin content of the pulp was only 2 per cent, against 3.2 for soda pulp cooked 7 hours. This clearly brings out the greater effectiveness of the sulphate process for removing lignin. The most striking difference between the two processes is in the rate of removal of cellulose during the first half hour of the cook. In the soda series the cellulose content of the wood was reduced from 60 to 50 per cent during this period, while in the sulphur-soda series the reduction was only one-half or from 60 to 55 per cent. This fact is of utmost importance in connection with the use of alkaline liquors in softening chips and later disintegrating them by mechanical means in the production of a high yield of medium grade pulp suitable for box board manufacture. This is especially significant, since the partially cooked chips in the sulphur-soda series were much softer and easier to disintegrate than in the corresponding cook of the soda series. The amounts of alpha—or resistant cellulose—in the pulp obtained from corresponding cooks of each series are about the same. As the cooks proceeded in each series the differences are not so marked, although the reaction in the sulphur-soda series is more definite in nature and reaches completion much more quickly. The pulping action insofar as the chemical tests would indicate, was practically finished at the end of 2½ hours in the sulphur-soda series, while in the soda series at least 3½ hours were required, using similar cooking conditions.

General Conclusions

The general effect of sulphur in the cooking of sulphate pulps is to speed up the cooking reaction, so that under similar cooking conditions the same degree of digestion is obtained at least one hour earlier in the case of somewhat under-cooked pulps, and in the case of well-cooked pulps the difference is more marked.

The physical tests, however, indicate a marked difference, especially in tearing and folding characteristics, the former being increased almost 20 per cent and the latter almost 500 per cent. Marked increase in bursting strength and tensile strength is also apparent.

Where equal yields of pulp are obtained, the cooks using sulphur produced pulps bleaching with half the bleach consumption of those made without sulphur.

The slowing up of the removal of cellulose during the first half hour of the cook was also a distinctive characteristic obtained with the use of sulphur, the loss of cellulose being reduced 50 per cent thereby. Otherwise there is little difference in the chemical composition of the pulps.

The Gold Standard

By J. H. TREGOE

NOTHING seems quite so tragic as an engine stalled for lack of fuel. In the business world there are many engines running their usual courses and because of their commonness we are apt to lose sight of the fact that they could not go without fuel.

In the field of banking and currency, we have admired and applauded the coöperative and protective powers of the Federal Reserve System. It is an engine of commerce and its fuel is the gold standard.

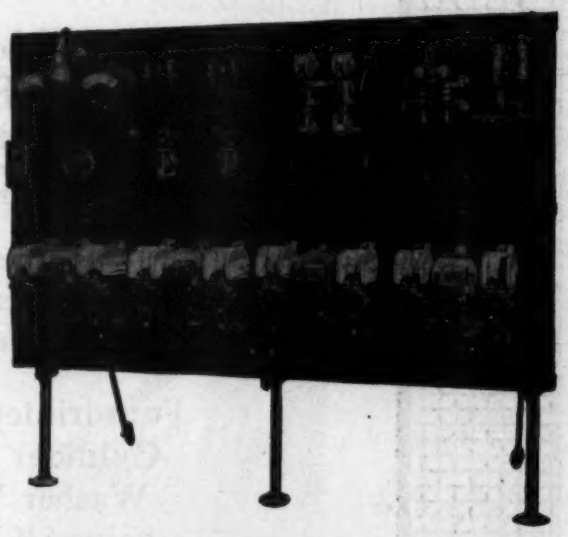
An address made by J. H. Puelicher of Milwaukee, president of the American Bankers' Association, to the Atlanta Convention of the National Association of Credit Men, brought out vividly the relations of the gold standard to our financial and commercial vitality. The treasury note of the United States and the mark of the Reichsbank of Germany are intrinsically worth nothing more than the paper on which the promise to pay is printed. The treasury note of the United States circulates at par because it can be exchanged for gold. The mark is practically worthless as it has no exchange value and circulates by fiat of the German government. Credit currency, therefore, is founded on an underlying value, and the currency will not circulate for more than its redemption value.

Currency should have three distinctive qualities: Universal acceptability, an ease of carriage and resistance to deterioration. Gold has these qualities and has become the world's standard of money value. From 1900 when the United States went squarely on a gold basis and other forms of currency were made exchangeable for gold, our commerce has expanded and our wealth has rapidly increased. The Federal Reserve System and its note issues have worked smoothly and played their parts well because underlying the System and supporting the notes is an adequate stock of gold.

We do not want to change this fuel. Any attempt to do so would disorganize our fiscal operations, our credit currency, our exchange of commodities. The idea of substituting commodities themselves, land or produce in any form for gold as the basis of our currency and credit issues is so far from sound economic thought that it should not be encouraged or given the least credence by our people. As a nation we have not given much thought to the gold standard. If we wish to keep the engines moving and the courses of commerce free of snags and drifts, let us hold fast to the gold standard and resist to the limit any effort to substitute mere commodities that do not possess the qualities that currency should have.

New Automatic Starters for Synchronous Motors

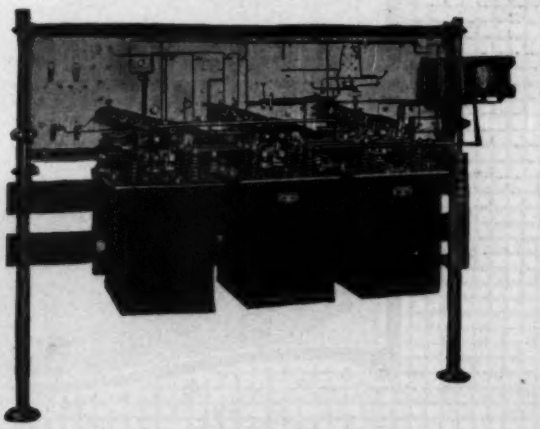
Automatic control of the starting of synchronous type motors is making possible the use of this type of motor to a greater extent, because the manual starting is apparently



C-H Auto Starter for use with synchronous motor on low tension line

a complicated procedure which takes considerable time and effort on the part of the attendant.

The acompanying illustrations show some recent types of automatic starting panels designed by The Cutler-Hammer Mfg. Company of Milwaukee. By the use of these controllers,



Rear view of C-H Auto Starter for use with synchronous motor on low tension line

the starting of a synchronous motor is as simple as for any other type—a push button station being the only part of the apparatus which the attendant need operate. The one illustration shows such a panel for use with a 440 volt motor. The other is a rear view of a panel for use in connection with a high tension synchronous motor.

We are STILL furnishing
FOURDRINIER WIRES
to the Paper Mills which used APPLETON WIRES No. 1, No. 2 and No. 3, shipped 27 years ago this spring

They tell us that
"Appleton Wires Are Good Wires"
in fact the best they have run

Fourdrinier Wires
Cylinder Wires
Washer Wires
Save-All Wires
In Brass and Phosphor Bronze

APPLETON WIRE WORKS
Appleton, Wis., U. S. A.

Most all modern synchronous motors are supplied with squirrel cage windings for starting purposes, and in addition to shifting the connections from the low voltage to the high voltage transformer taps, it is necessary to connect the field winding of the motor to the D. C. Exciter at the proper time.

Synchronous motors are usually of a size which requires a starting compensator of greater capacity than the average manual size, and are in many cases wound for high voltages. For these reasons also automatic control with magnetic contactors is preferable. Oil switches are used, one for connecting the motor to the starting transformer, and another to connect the motor to the line. After the motor is up to speed and the field switch closed,—the starting switch must be opened and running switch closed. If these operations are not carried out properly, various troubles arise, such as high peak currents, breaking down of the insulator,—which makes the automatic starter with its simple push button control so attractive.

In one recent installation in a pumping station, the "start" and "stop" push button station was located one mile distant. For automatic starting of a synchronous motor driving a pump, a float switch may be employed which will start the motor at low level and stop it when a pre-determined high level is reached. On a closed system, a pressure regulator may be used in place of the float switch for accomplishing the starting and stopping, being connected in the pilot circuit to the main magnetic switch of the automatic starting panel. With some installations a magnetic clutch is used between motor and driven machine which remains disengaged during the period that the motor is getting up to speed and synchronizing.

An Industrial Democracy

The employer-employe relationship at the Riverside and Dan River Cotton Mills has been solved to employes' satisfaction to such a degree that the workers have initiated a campaign to tell other industries about it.

Industrial Democracy prevails at these Virginia cotton mills. The industrial government is patterned after the Federal government. There is a House of Representatives, Senate and Cabinet. The cabinet is composed of the president of the corporation and half a dozen superintendents and higher executives. The Senate is made up of mill foremen. The representatives are elected by the workers, each department having representation in this body. Under the constitution an assistant foreman is eligible to election as representative, but few of them are; the worker voters in most instances have the feeling that one of the rank and file, and not an assistant foreman, would be more likely to reflect rank and file sentiment in house balloting.

The House of Representatives can vote—and has voted—a wage increase to the rank and file workers who elect the members of the House. The House of Representatives can vote—and has voted—to decrease the wages of these people.

The Cabinet has the power to veto a bill passed by the House and O. K.'d by the Senate. But out of over 400 bills thus far passed by this "Congress" not one has been killed by the Cabinet.

On two different occasions since the armistice, a wage cut has been voted. On one occasion when a wage change was seen to be inevitable, fifty different bills were introduced in the House. Finally committees from the House, Senate and Cabinet got together and thrashed the matter out. They worked nights for weeks. The records of these hearings made a bound volume six inches thick.

The employer, as represented by the Cabinet, laid all cards on the table. The rank and file employes, through the reports of their "congressmen," made either formally at a meeting or between bites at noon time, comprehended pretty well in the end just about what the cotton mills could and could not do in the way of wages.

The wage cut bill was not passed by the House unanimously by any means—but, however, by a large majority. There were some rank and file workers who wanted to keep their high wages whether or no. And some "congressmen," in order to hold their jobs, voted as their constituents directed regardless of the facts established by the committee hearings. Proving that some "congressmen" are alike whether they sit in Washington or in Schoolfield, Va.

The result of this system of Industrial Democracy was that in the end the great majority of workers were convinced and satisfied that a wage cut had to be.

And while wage cuts were answered by strikes in other textile mills, the Riverside and Dan River Cotton Mills continued full speed ahead.

The workers have become so enthusiastic over their system of industrial government that they are determined to tell others about it. The motion picture was one of the mediums selected to disseminate the information. The Rothacker Film Company, of Chicago, produced a five-reel motion picture, which will cause the American public to see the cotton industry in a new light. No child labor or unhealthful workrooms in the Riverside and Dan River plants! Enough of textile manufacture is shown to give to the audience the effect of a personal trip through the mills, where are seen the principal processes raw cotton goes through to become a finished bolt of cloth. And everywhere ideal shop conditions and workers whose faces tell the movie camera that they are contented and in earnest about their jobs.

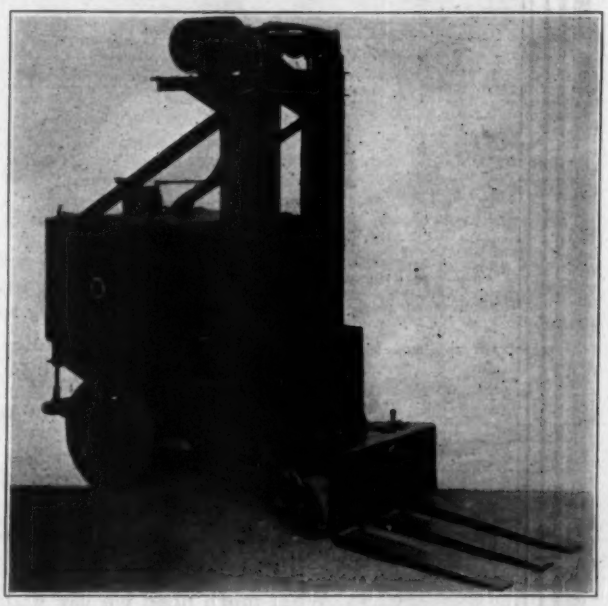
The Industrial Democracy "citizens" of Schoolfield, Va., is loaning this picture, on request, to industrial plants, department stores, churches, colleges, civic organizations, unions, clubs—any group that is interested.

New Model Lift Truck

A new model Tier-Lift Truck, which should prove of great value in the handling of cased paper, has been placed on the market by the Lakewood Engineering Company of Cleveland, Ohio.

A tier of cases not exceeding 2,500 pounds in weight and placed on 2"x2" strips can be lifted by this truck, photograph of which is shown herewith.

This truck embodies the particular feature of being able to pick up its load without the use of platform skids, and in addition allows for the tiering or stacking of units without



the usual waste space of 12" to 14", which is incident to the tiering of loads on platform skids.

The truck was designed to meet the user's requirements in the handling of such commodities as flat paper, barrels, dies, etc. It is made in various lifting heights and will no doubt prove to be a great time and labor saver in mills and warehouses where such a truck is needed.

Handling Rubber Latex

It has been found that the sap of the rubber tree can be shipped direct, without the danger of coagulation. Heretofore the rubber sap has been boiled down to solid substance before being shipped. This has necessitated the difficult handling of the solid rolls of crude rubber.

When this new method is put in operation the rubber sap will be shipped in thick liquid form, after being concentrated at the plantations.

As there are other properties in the liquid sap that can be used by manufacturers, which are absent in the solid crude rubber, the desirability of this method is increased. A saving of time, labor, and money is also expected by the establishment of this plan.

DOWNINGTOWN

Beating Hammer Heads

THIS illustration was made from an unretouched photograph of a machinist's hammer that accidentally fell into a Downingtown Bandless Beater, in the Hinde & Dauch Paper Company's Mill at Fort Madison, Iowa.

The hammer head was in contact with the special steel fly bars for 7 hours.

Though ¼" of hardened steel was ground off the hammer head,—no apparent injury was done to the roll or fly bars. This Downingtown Beater with its Bandless Beater Roll is still in active service.

What more need we say and what more could be expected of a beater? Write for our special bulletin describing Downingtown Bandless Beaters. See how the fly bars are secured in the roll without use of keys, wedges, etc.

DOWNINGTOWN MANUFACTURING COMPANY

Paper and Pulp Mill Machinery

P. O. BOX 8, EAST DOWNINGTOWN, PA., U. S. A.

American Pulpwoods

By SIDNEY D. WELLS

(Continued from July issue)

REDWOOD—Sequoia sempervirens. Wt. 23 lbs. Fiber 5.5 m.m.

Range—From the southern borders of Oregon (on Chetco river, about six miles from mouth, and on Winchuck river), and southward in the coast region (twenty to thirty miles inland) through California (to Salmon creek canyon, twelve miles south of Punta Gorda, Monterey county).

Common Names—Sequoia (Cal.); coast redwood (Cal.); redwood (Cal. and Am. lit.); California redwood (Eng. lit.).

Sulphite Pulp—
Yield 1,100 lbs.
Character—
Easily pulped.
Difficult to bleach.
Fair strength.
Dark colored.
Possible uses—Low grade wrappings.

Sulphate Pulp—
Yield 950 lbs.
Character—
Long fibered but tender.
Possible uses—As a substitute for spruce.

ASPEN—Populus tremuloides. Wt. 23 lbs., Fiber 1.0 m.m.

Range—Southern Labrador to Hudson bay (southern shores) and northwestward to the Mackenzie river (near mouth) and Alaska (Yukon river); southward to Pennsylvania (mountains), northeastern Missouri, southern Nebraska and throughout the western mountains to northern New Mexico and Arizona and central California; Lower California (San Pedro Matir mountains) and Mexico (mountains to Chihuahua).

Common Names—Aspen (N. H., Mass., R. I., Conn., N. Y., N. J., Pa., Del., Ill., Ind., Wis., Mich., Minn., N. Dak., Neb., Ohio, Ont., Ore., Utah, Idaho, Nev., Mont., Colo., Cal.); quaking asp (N. Y., Pa., Del., Cal., N. Mex., Idaho, Colo., Ariz., Ill., Iowa, Minn., Mont., Neb., Utah, Ore., Nev.); mountain asp (Mont.); American aspen (Vt.); aspen leaf (Pa.); white poplar (Mass.); trembling poplar (Minn., Colo.); American poplar (Minn., Colo.); poplar (Vt., N. Y., Ill., Ind., Minn., Mont.); popple (Wis., Iowa, Mont.); tremble (Quebec); trembling aspen (Iowa); aspen poplar (Cal., Mont.).

Sulphite Pulp—
Yield 1,030 lbs.
Character—
Easily pulped.
Easily bleached.
Very weak.
Excellent color.
Possible uses—Used with longer fibered stock for better grade of papers.

Soda Pulp—
Yield 1,080 lbs.
Character—
Easily bleached.
Soft and short fibered.
Possible uses—When bleached and mixed with longer fibered bleached stock is well adapted for book, envelope and high grade printings.

Mechanical Pulp—
Yield 2,170 lbs.
Character—
Poor strength.
Short fibered.
Good color but may have black specks present.
Possible uses—As a filler when used with longer fibered stocks.

BALM OF GILEAD—Populus balsamifera. Wt. 26 lbs. Fiber 1.0 m.m.

Range—Coast of Alaska and valley of Mackenzie river (latitude 60 degrees) to Hudson bay and Newfoundland; southward to northern New England and New York (Taughannock falls, Cayuga lake), central Michigan, and Minnesota, Dakota (Black hills), northwestern Nebraska, northern Montana, Idaho, Oregon and Nevada.

Common Names—Balsam (N. H., N. Y., Wis., Mich., Minn., Neb., Mont., Ohio, Ont.); Balm of Gilead (Me., N. H., Vt., Mass., R. I., Conn., N. Y., Mich., Neb., Minn., N. Dak., Ont.); cottonwood (Idaho); poplar (Wis., Minn.); balsam poplar (N. H., Vt., Neb., Minn.); tacamahac (Minn.); baumier (Quebec); rough-barked poplar (Hudson bay region).

"TOLEDO"

Pipe Tool Equipment Is Ideal for Paper Mills

Fast, easily handled and highly efficient "Toledo" pipe tool equipment is ideal for paper mills. Here a "Toledo" Pipe Cutter operated by a "Toledo" Power Drive is cutting off 8" pipe, and the "Toledo" No. 3 tool is ready to be swung on the cut end to thread it.

At a fraction the cost of power machines, "Toledos" will enable you to equip your mill for any pipe cutting and threading job that might arise. Portable, easy to operate anywhere on even the larger sizes of pipe, "Toledos" can be instantly converted into swift, efficient power machines simply by connecting a "Toledo" Power Drive.

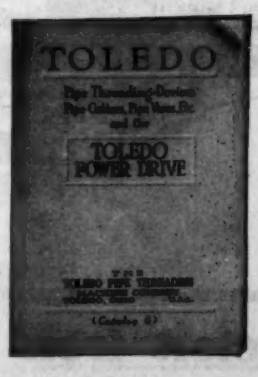
Investigation into their merits will convince you of their superiority.

"TOLEDO"

Appears only on genuine "Toledo" Tools. Look for it. Insist on it when buying.

THE TOLEDO PIPE THREADING MACHINE CO., Toledo, Ohio

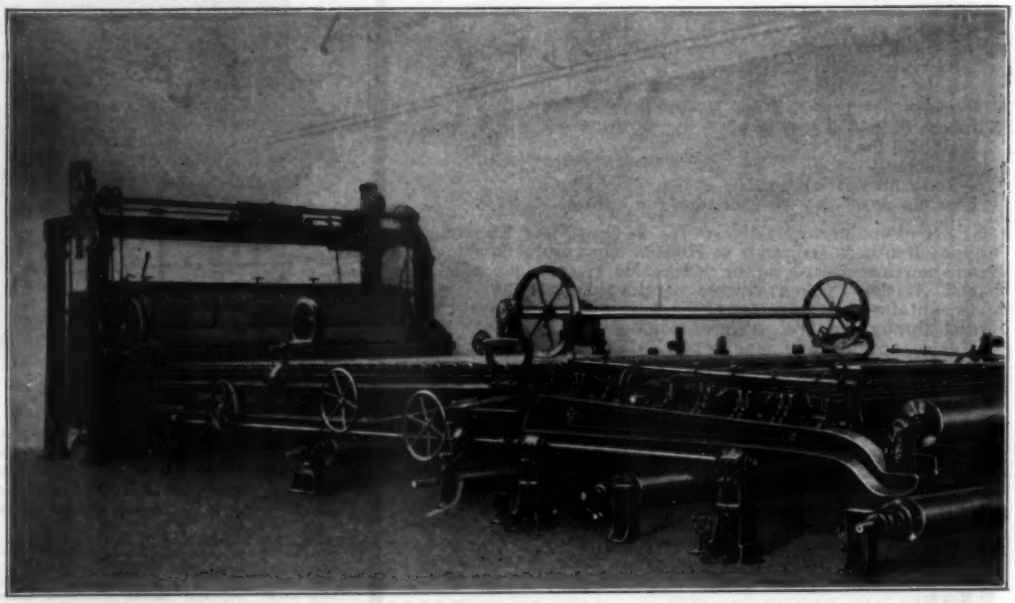
New York Office, 50 Church St.

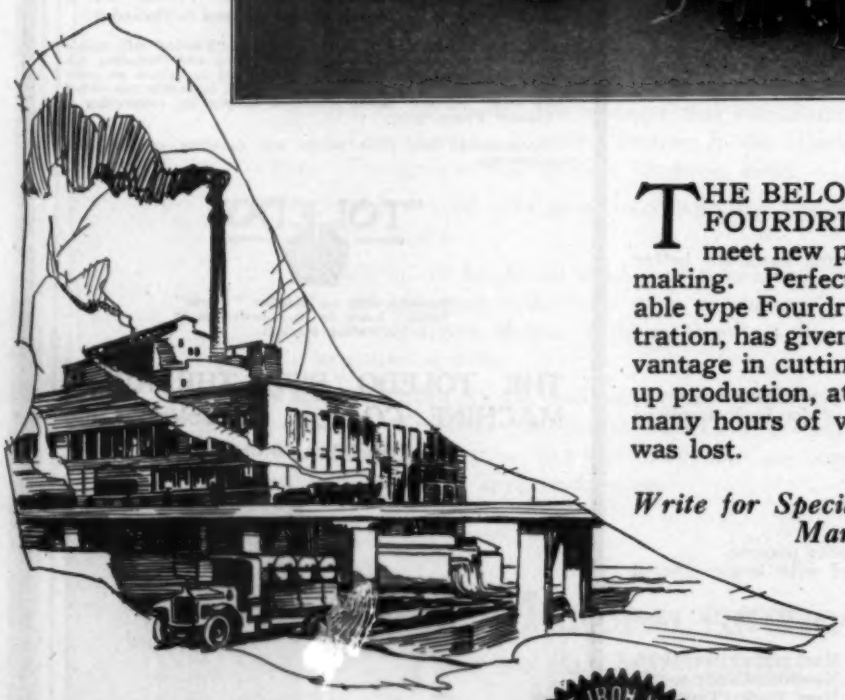


This is the new "Toledo" catalog G. A complete book on "Toledo" tools. Ask for your copy.

BELOIT IRON WORKS PAPER MACH'Y BELOIT WIS

The Beloit Adjustable Fourdrinier





THE BELOIT ADJUSTABLE TYPE FOURDRINIER was developed to meet new problems in the art of paper making. Perfecting of a practical, adjustable type Fourdrinier, as shown by the illustration, has given to paper men an added advantage in cutting down costs and speeding up production, at the same time eliminating many hours of valuable time that formerly was lost.

Write for Special Bulletin Describing Its Many Advantages

BELOIT IRON WORKS PAPER MACH'Y BELOIT WIS

Beloit Iron Works **Beloit, Wis., U. S. A.**

Sulphite Pulp—
Yield 1,300 lbs.
Character—
Easily pulped.
Easily bleached.
Excellent color.
Possible uses—Same as aspen.
Soda Pulp—
Yield 1,170 lbs.
Character—
Easily bleached.
Short fiber and soft.
Possible uses—Same as aspen.
Mechanical Pulp—
Similar to aspen.

COTTONWOOD—Populus deltoides. Wt. 23 lbs. Fiber 1.3 m.m.
Range—From Quebec (Lower Maurice river) and Vermont (Lake Champlain) through Western New England and new York, Pennsylvania (west of Alleghenies), Maryland, and Atlantic states to western Florida and west to the Rocky mountains from southern Alberta to northern New Mexico.
Common Names—Cottonwood (N. H., Vt., Mass., R. I., N. Y., N. J., W. Va., N. C., Ala., Fla., Miss., La., Tex., Cal., Ky., Mo., Ill., Wis., Kan., Neb., Iowa, Minn., Mich., Ohio, Ont., Colo., Mont., N. Dak., S. Dak.); big cottonwood (Miss., Neb.); yellow cottonwood (Ark., Iowa, Neb.); cotton-tree (N. Y.); Carolina poplar (Pa., Miss., La., N. Mex., Ind., Ohio); necklace poplar (Texas, Colo.); Vermont poplar (Vt.); whitewood (Iowa); broad-leaved cottonwood (Colo.).
Sulphite Pulp—
Yields 1,035 lbs.
Character—
Easily pulped.
Easily bleached.
Very weak.
Excellent color.
Possible uses—Same as aspen.
Soda Pulp—
Yield 1,030 lbs.
Character—
Soft and easily bleached.
Possible uses—Same as aspen.
Mechanical Pulp—
Yield 2,180 lbs.
Character—
Weak, short fibered, good color.
Possible uses—As a filler when used with longer fibered stocks.

LARGETOOTH ASPEN—Populus grandidentata. Wt. 22 lbs. Fiber 1.1 m.m.
Range—Nova Scotia through New Brunswick, southern Quebec and Ontario to northern Minnesota; southward to Delaware (and along the Allegheny mountains to North Carolina, central Kentucky and Tennessee), southern Indiana and Illinois.
Common Names—Large-toothed aspen (N. J., Pa., Del., S. C., Mich., Minn.); poplar (Me., N. H., Vt., Mass., R. I., Conn., N. Y., N. J., Pa., W. Va., N. C., S. C., Ga., Ill., Ohio); large-toothed poplar (N. C.); large poplar (Tenn.); white poplar (Mass.); popple (Me.); large American aspen (Ala.).
Sulphite Pulp—
Yield 1,000 lbs.
Character—
Easily pulped and bleached.
Very weak but excellent color.
Possible uses—Used with longer-fibered stock for better grade of papers.
Soda Pulp—
Yield 1,000 lbs. opaque.
Character—
Easily pulped and bleached.
Soft, opaque and short fiber.
Possible uses—Same as aspen.
Mechanical Pulp—
Same as aspen.

NORWAY POPLAR—Probably cottonwood. Pulping tests the same as for cottonwood.

YELLOW POPLAR—Liriodendron tulipifera. Wt. 26 lbs. Fiber 1.8 m.m.
Range—From Rhode Island to southwestern Vermont and west to Lake Michigan (through southern Michigan as far north as Grand river); south to Florida, southern Alabama, and Mississippi, west of Mississippi river in southeastern Missouri and adjacent Arkansas.
Common Names—Tulip tree (Vt., Mass., R. I., Conn., N. Y., N. J., Del., Pa., Va., W. Va., D. C., N. C., S. C., Cal., Ark.,

COMBATING CORROSION

PROTECTION, durability, economy and good appearance, the qualities demanded in an efficient paint for steel structures and equipment, are all embodied in Bitumastic Solution.

Protection Possessing the well known preservative qualities of bitumen, Bitumastic Solution gives real protection. It prevents contact between the steel and surrounding air and moisture and so prevents corrosive action. It is not affected by moisture, weather conditions, sulphurous gases and other chemical fumes. It stands up exceedingly well against high temperatures, its heat resisting quality being a prime feature.

Durability Bitumastic Solution is exceptionally long-lived. It bonds firmly to the surface painted. Will not chip or peel. Does not dry out or evaporate leaving a porous coating of pigment, but retains its integrity for a prolonged time.

Economy Economy is the direct result of the durability of Bitumastic Solution. Giving long-time service, frequent repainting is not necessary, saving not only the cost of paint, but also the labor of application, which is far more costly.

Appearance Bitumastic Solution has a high, glossy finish that adds to the appearance of any plant, factory, building or piece of equipment. Its hard surface sheds dust instead of allowing it to cling. The gloss does not wear off in a short time, but remains bright and shiny and gives a sense of satisfaction and pride to the owner or engineer.

Uses Among the many purposes for which Bitumastic Solution is used are the protection of sheet metal roofs and buildings, structural steel, steel sash, boiler fronts and breechings, stacks, pipes, tanks, air washers, fans and ventilating ducts and other steel structures.

Write our nearest office for information regarding the solution of any particular corrosion problem you may have, or ask for sample can.

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17 Battery Place, New York

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Rockefeller Building Cleveland

The Sign of Efficiency

MORSE DRIVES

The Sign of Durability

Positive as Gears

THE MORSE "ROCKER JOINT"

Flexible as a Belt

Longer Life

Fifteen Morse Silent Chain Drives in Congoleum Company Mill

The illustration shows one of the fifteen Morse Silent Chain Drives in the mill of the Congoleum Company, Asbestos, Maryland, driving a Jordan engine from a 150 H.P. motor on felt stock, one of the hardest kinds of stock to refine.

This mill uses the following Morse Chain Drives:—one 150 H.P.; four 100 H.P.; nine 90 H.P.; one 75 H.P.; all doing splendid work.

Morse Chains are 99% efficient, silent, durable and economical to maintain.

Where you have unusual and hard conditions from wear and exposure, Morse Silent Chains prove their greatest worth.

For driving Jordan engines, beating engines, paper machine line shafts, and for many other places in the paper mill, the ideal drive is the Morse Silent Chain.

MORSE CHAIN CO., LARGEST MANUFACTURERS OF SILENT CHAINS IN THE WORLD **ITHACA, N. Y.**

Write today for booklet

Morse Engineering Service **BENEFIT BY MORSE SERVICE AS OTHERS DO** *Assistance Without Obligation*

Address Nearest Office

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CLEVELAND, OHIO.....Engineers Bldg.
DETROIT, MICH.....1361 Abbott Street
KANSAS CITY, Mo.....Finance Bldg., Morse Eng'rg Co.
NEW YORK CITY.....26 Church Street
MINNEAPOLIS, MINN.....So. 3rd St., Strong-Scott Mfg. Co.
MONTREAL.....St. Nicholas Bldg., Jones & Glasco Eng'd
PHILADELPHIA, PA.....Fuller Bldg.
PITTSBURGH, PA.....Westinghouse Bldg.
SAN FRANCISCO, CAL.....Monadnock Bldg.
ST. LOUIS, MO.....Chemical Bldg., Morse Eng'rg Co.
TORONTO....Bank of Hamilton Bldg., Jones & Glasco Eng'd
WINNIPEG, MAN.....Dufferin St., Strong-Scott Mfg. Co.

"Morse" is the Guarantee Always Behind the Efficiency, Durability and Service

Ky., Ohio, Ind., Ill., Ont.); whitewood (Vt., Mass., R. I., Conn., N. Y., N. J., Del., S. C., Ky., Ohio, Ill., Mich., Ont.); yellow poplar (N. Y., N. J., Pa., Del., Va., W. Va., N. C., S. C., Ala., Ark., Ky., Ohio, Ind., Mo.); tulip poplar (N. J., Del., Pa., S. C., Ill.); West Virginia poplar (Pa., Del., Md., W. Va.); poplar (R. I., Del., N. C., S. C., Fla., Ohio); white poplar (Pa., Ky., Ind.); blue poplar (Del., W. Va.); hickory (Va., W. Va., N. C.); popple (R. I.); cucumber tree (N. Y.); canoe wood (Tenn.); old wife's shirt-tree (Tenn.); Ko-yen-ta-ka-ah-ta—"white tree" (Onandaga Indian, N. Y.); basswood (Ohio).

Sulphite Pulp—
Yield 1,170 lbs.
Character—
Easily pulped.
Difficult to bleach.
Poor color.
Possible uses—As a substitute for aspen.

Soda Pulp—
Yield 1,150 lbs.
Character—
Soft, opaque and easily bleached.
Possible uses—Same as aspen.

Mechanical Pulp—
Same as aspen but slightly stronger.

BASSWOOD—Tilia americana. Wt. 21 lbs. Fiber 1.1 m.m.

Range—New Brunswick to Virginia and (along Allegheny mountains) to Georgia and Alabama (mountains); west (in Canada) to Lake Superior (eastern shores) and to Lake Winnipeg (southern shores) and Assiniboine river (in United States), to eastern Dakota, eastern Neb., Kansas, Oklahoma and eastern Texas.

Common Names—Basswood (Me., N. H., Vt., R. I., Mass., Conn., N. Y., N. J., Del., Pa., W. Va., D. C., N. C., S. C., Ga., Ala., Miss., La., Ark., Ky., Ill., Ind., Iowa, Wis., Mich., Ohio, Ont., Neb., Kan., Minn., N. Dak.); American linden (Me., N. H., R. I., N. Y., Pa., Del., N. C., Miss., Ohio, Ill., Neb., N. Dak., Ont., Minn.); linn (Pa., Va., W. Va., Ala., La., Ill., Ind., Ohio, Mo., Iowa, Kan., Neb., Wis., S. Dak.); linden (Vt., R. I., Pa., W. Va., Neb., Minn.); limetree (R. I., N. C., S. C., Ala., Miss., La., Ill.); whitewood (Vt., W. Va., Ark., Minn., Ont.); beetree (Vt., W. Va., Wis.); black limetree (Tenn.); smooth-leaved limetree (Tenn.); white lind (W. Va.); wickup (Mass.); yellow basswood (Ind.); lein (Ind.).

Soda Pulp—
Yield 1,020 lbs.
Character—
Soft and easy bleaching.
Possible uses—Similar to aspen.

Mechanical Pulp—
The same as aspen.

BLACK WILLOW—Salix nigra. Wt. 21 lbs. Fiber 0.8 m.m.

Range—New Brunswick to southern Florida and west to eastern Dakota, Nebraska, Kansas, Oklahoma, southern Arizona, and south into Mexico. In California from the Sierra Nevada to Colusa county, and Sacramento river to Arizona.

Common Names—Black willow (N. H., Vt., R. I., N. Y., Pa., Del., S. C., Fla., Ala., Miss., La., Tex., Ariz., Cal., N. Mex., Utah, Ill., Wis., Mich., Minn., Neb., Kan., Ohio, Ont., N. Dak.); swamp willow (N. C., S. C.); willow (N. Y., Pa., N. C., S. C., Miss., Tex., Cal., Ky., Mo., Neb.).

Sulphite Pulp—
Yield 1,100 lbs.
Character—
Easily pulped.
Easily bleached.
Very weak.
Excellent color.
Possible uses—Same as aspen.

Soda Pulp—
Yield 950 lbs.
Character—
Soft and easily bleached.
Possible uses—Similar to aspen.

Mechanical Pulp—
The same as aspen.

LONGLEAF WILLOW—Salix fluviatilis. Wt. 23 lbs. Fiber 0.7 m.m.

Range—Quebec (Lake St. John and Island of Orleans) and southward through western New England to the Potomac river; northwestward to the Arctic circle (valley of Mackenzie river) and British Columbia and California; southward in the Mississippi river basin to northern Mexico and Lower California.

Common Names—Sandbar willow (R. I., Miss., Cal., Kan., Neb., Minn., S. Dak., Wis., Ont.); longleaf willow (Ala., Kan., Mich.); long-leaved willow (Tenn., Minn., Neb., Colo.,

Cleveland Worm Gear Reduction Unit applied to press rolls in paper machine. Motor 40 H. P. at 900 R.P.M. Reduction in worm drive 10⅔ to 1

True economy is measured by results

First cost is no longer recognized as a prime factor in operating economy.

Today men are thinking along lines of permanent economies. The larger the interests involved the more carefully is the constant expense considered. Overhead is a vital factor in earnings.

Thus it is interesting to note that our sales are largely made on the basis of proven performance to institutions who have learned by test and experience that Cleveland Worm Gear Speed Reduction Units effect permanent economies.

The more searching the test the more certain is the adoption of Cleveland Units.

For they appeal decisively on at least four counts:

(1) High efficiency—minimum power losses.
(2) Absolute evenness of torque insuring less wear and tear on machinery operated and frequently a much better product.
(3) Quietness of operation reflected in better service from and to employees.
(4) Low maintenance cost—no attention required except to maintain oil level.

There are many other advantages but these are outstanding gains that swing decisions.

Complete information is available on request together with facts concerning precise uses.

The Cleveland Worm & Gear Co.

America's Worm Gear Specialists

CLEVELAND, OHIO

Cleveland WORM GEAR REDUCTION UNITS

Layne Well Water System

YOUR WATER SUPPLY GUARANTEED

Preliminary Capacity Test at the Plant of the Richardson Co., Lockland, Ohio; 7,000,000 Gallons a Day from Their Wells

Advantages of the Layne Well Water System

1. Specific quantity of water guaranteed.
2. Power cost known before contract is signed.
3. Responsibility rests with one company.

RESPONSIBILITY

When you buy equipment today it is essential that the manufacturer be responsible for the product he sells. He must be responsible to the extent of making good any defective parts and to see that the customer is entirely satisfied in every way. In a water supply system upon whom can you place the responsibility in case of dissatisfaction? The pump, the screen, the well and the pipe are parts of the complete system. But is any individual firm responsible for the adequate and continual supply of well water—in the ordinary way of contracting—NO. In the Layne well water system—YES. From us you can contract for water and leave the entire responsibility up to us. We guarantee to produce on your property a specific quantity of water for a stipulated price. We take all the responsibility. One of our engineers will investigate your water supply problem at your request.

LAYNE & BOWLER CO., Memphis, Tenn.

FACTORIES: MEMPHIS, TENN.; LOS ANGELES, CAL.; HOUSTON, TEXAS

ASSOCIATE COMPANIES

Layne New York Co., Room 1871, 29 Church St., N. Y. City
Layne & Bowler Chicago Co., 800 Old Colony Bldg., Chicago, Ill.
Layne Arkansas Co., Stuttgart, Ark.
Layne Ohio Co., Wyoming Station, Cincinnati, Ohio
Layne Southeastern Co., 1st Nat'l Bk. Bldg., St. Petersburg, Fla.
Layne Central Co., Memphis, Tenn.
Branch Office, Crowley, La.

Cal., Idaho, Wash.); narrow-leaved willow (Neb.); shrub willow (Neb.); white willow (Mo.); red willow (Mont.); osier willow (Mont.); willow (Vt., N. Y., Ky., Ind., Miss., Tex., Cal., Nev., Utah, Mont.).

Sulphite Pulp—
Yield 1,100 lbs.
Character—
Easily pulped and bleached.
Very weak and poor color.
Possible uses—Same as aspen.

Soda Pulp—
Yield 1,030 lbs.
Character—
Easily pulped.
Rather difficult to bleach.
Soft, opaque and short fiber.
Possible uses—Same as aspen.

Mechanical Pulp—
Same as aspen.

RED ALDER—Alnus Oregona. Wt. 23 lbs. Fiber 1.2 m.m.
Range—From Sitka (through islands and coast ranges of British Columbia, western Washington, and Oregon) to California (coast ranges to Santa Inez mountains, near Santa Barbara).
Common Names—Alder (Cal., Ore.); red alder (Cal., Ore.); western or red alder.

Soda Pulp—
Yield 1,160 lbs.
Character—
Soft; a little harder to bleach than aspen.
Possible uses—Same as aspen.

Mechanical Pulp—
Probably the same as aspen.

BALSA—Ochroma lagopus. Wt. 7 lbs.* Fiber 1.33 m.m.†
Range—Tropical America, Cuba, Jamaica and Porto Rico.
Common Names—Lanero (Cuba); corkwood; down-tree, dum and bombast mahoe (Jamaica).

Sulphate Pulp—
Yield 280 lbs.
Character—
Easily pulped and bleached.
Possible uses—Because of extremely low yield per cord, it is probable that this wood has no value as a source of pulp.

BOXELDER—Acer negundo. Wt. 30 lbs. Fiber ———.
Range—Vermont (Lake Champlain and Winoski river), New York (Cayuga lake), eastern Pennsylvania, and south to Florida (Hernando county); northwestward to Winnipeg (Dogs Head lake and along southern branch of the Saskatchewan river), to the eastern base of the Rocky mountains (in British America), to Montana (Rocky mountains), Utah (Wasatch mountains), western Texas, New Mexico and eastern Arizona.
Common Names—Boxelder (Vt., Mass., R. I., Del., N. Y., N. J., Pa., Va., W. Va., N. C., S. C., Ala., Fla., Miss., La., Tex., Ark., Mo., Ariz., N. Mex., Mont., Ill., Ind., Wis., Ohio, Mich., Iowa, Kan., Neb., N. Dak., S. Dak., Minn.); ash-leaved maple (R. I., Mass., N. J., Pa., Del., Va., S. C., La., Tex., Ill., Wis., Iowa, Ont., Kan., Neb., Mont., N. Dak., Mich., Minn.); cut-leaved maple (Colo.); negundo maple (Ill.); Red river maple (N. Dak.); three-leaved maple (Pa.); black ash (Tenn.); stinking ash (S. C.); sugar ash (Fla.); water ash (Dakotas).

Sulphite Pulp—
Probably the same as red maple.

Soda Pulp—
Yield 1,300 lbs.
Character—
Easily pulped.
Rather difficult to bleach.
Soft, opaque and short fiber.
Possible uses—Same as aspen.

Mechanical Pulp—
Probably the same as black gum.

* From comparatively few specimens.
† The result of 50 measurements.

(*Continued in September issue*)

American Wringer Company Incorporated

The American Wringer Company of Woonsocket, R. I., has been reorganized under the name American Wringer Company, Inc., with the following ocffiers: Harold T. Merriman, president and treasurer; William G. Roelker, vice president; G. R. Keltie, secretary and general manager.

The manufacture of Horse Shoe brand clothes wringers and mechanical rubber rolls for industrial uses will be continued on a larger scale.

STANDARDIZATION

The increased production of uniform, trade-marked papers has marked the progress of the paper industry, putting paper making on a sounder business basis, bringing steady prices and uniform quality.

But back of uniform quality must be dependable machinery, capable of steady, uniform performance; machines like the Appleton Jordan Engine, efficient in operation, easily adjusted to the stock used, giving maximum production with low power consumption.

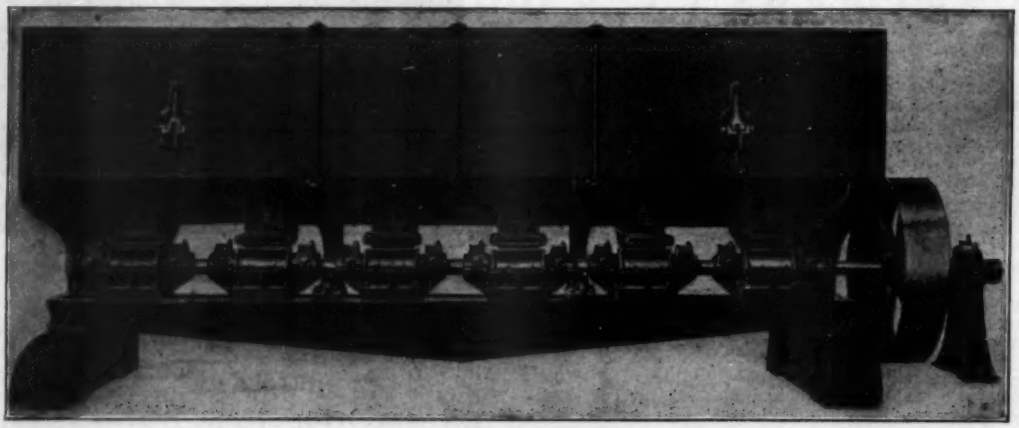
Standardize on Appleton Jordans.

Write for detailed information

THE
APPLETON MACHINE COMPANY

Designers and Builders of Paper Mill and Pulp Mill Machinery at
APPLETON, WISCONSIN

Pulp and Paper Mill Machinery



FLAT SCREENS
Made in **All Sizes from 6 to 18 Plates Inclusive**

Grinders

Three and Four Pockets

Equipped with **all Latest Devices** including our **Patented Pulp Scraper between the pockets.**

Inquiries Solicited

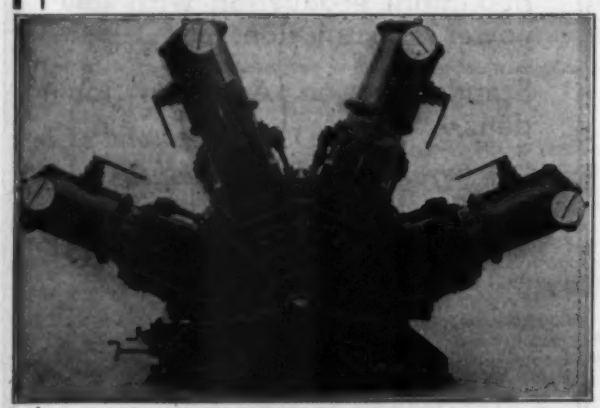
Chippers

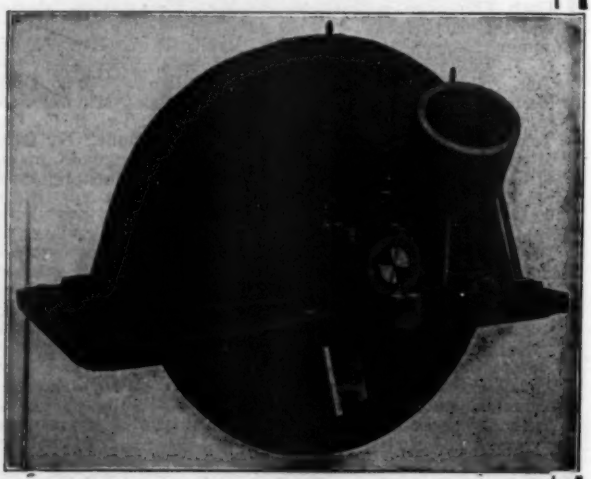
Made in 48″, 84″ and 90″ sizes, right or left hand; three or four knives.

The 48″ chipper is intended for small wood or slabs.

Our patented improvements make the production of clean, evenly cut chips, free from slivers, possible.

Description on request





We also manufacture Cylinder Molds, Wet Machines, Barkers, Pumps, Iron, Brass, Bronze and Lead Castings

Union Iron Works, Bangor, Maine

Causes of Industrial Accidents Analyzed by Insurance Companies

The exact degree of the seriousness of each of the principal causes of industrial accidents, which was heretofore largely measured by the exercise of personal judgment, is now definitely known for the first time as the result of an analysis of the causes of 350,000 industrial accidents recently made by the National Bureau of Casualty and Surety Underwriters for the National Council on Compensation Insurance. This analysis provided the basis for the new industrial compensation rating schedule which went into effect on July 1 of this year.

The new rating schedule, which is applicable to every industrial plant carrying workmen's compensation insurance in nearly every state in the Union, while similar in a general way to the rough schedules which preceded it, presents for the first time an accurate system of measuring the compensation cost of the accident hazards of any individual plant. The use of this system for determining the rates for workmen's compensation insurance to be applied to any particular plant should, according to Jesse S. Phillips, General Manager of the National Bureau, increase greatly the effectiveness of industrial accident prevention work by revealing to the individual plant manager those accident causes in his plant which are most productive of accident costs.

The revision of the old rating schedule, participated in by representatives of all classes of casualty insurance companies, has been under way approximately two years. The outstanding difference between the old and the new schedule is that the latter is based on the actual cost of various types of accidents, as revealed by the study of 350,000 accidents, whereas the old schedule was based almost entirely on judgment or on unrefined statistics. The structure of the schedule has at the same time been greatly improved and simplified.

The accidents covered by this analysis all occurred within one recent year in the plants insured by members of the National Bureau of Casualty and Surety Underwriters which is the representative national organization of the principal stock casualty companies in the United States.

The most striking revelation of this analysis was the seriousness of the point of operation on machines as an accident factor. Safety engineers have always recognized that unguarded points of operation on machines constituted one of the most prolific sources of accidents. But the high percentage of this type of accident revealed by the survey surprised all of the insurance companies' engineers and research men. These men were not surprised to find that in the machine shop industries machinery was responsible for about 32 per cent of the total accident costs of those industries and that the point of operation of machines alone was responsible for 20 per cent of the total accident cost. Contrary to all expectations, however, the analysis revealed that in many industries the cost of accidents due to machines, and particularly to the point of operation of machines, was greater than for machine shop industries.

In the opinion of the men who made this analysis the unexpected severity of machinery accidents is accounted for by the fact that the point of operation is the accident cause to which workmen are exposed the greatest part of their time and by the fact that the point of operation of a machine presents the most difficult problem to be met with in mechanical guarding. They found that in the case of some machines it is not difficult to design guards for the point of operation which will prevent accidents without reducing production; on the other hand it is extremely difficult to meet both these conditions in the case of many other machines.

Furthermore, it was recognized that there is a constant tendency in industry to substitute mechanical for manual operations, and as a result machine accidents are bound to cause an increasing proportion of the total number of accidents.

Java Art Paper

The world longs for color; otherwise the Neuruppin and Munich colored picture sheets, the ancestors of the colored comic supplements of the large American daily papers, would not have acquired such a world wide reputation. The modern book binder and boxmaker prefers color. We come again to the somewhat naive, phantastic natural coloring which is originated by eastern races. The characteristic for this movement is the colored paper. The latter is made in various kinds by the printing process and in quantities. Since, however, the batik art becomes more popular in the field of handicraft, the Java Java artpaper has found many admirers—a combination of hand and machinework.

These fine samples of modern paper production are used

MITTS & MERRILL

Conveyor or Gravity Feed Shredder

THE operation of a beater, with its wear and tear and tremendous power consumption, has one primary purpose, namely, hydration. Anything that will economically bring about hydration more quickly relieves the beater just that much, cuts down on operating costs and speeds the process of paper making.

The Mitts & Merrill Shredder performs on magazines, books, old paper and boxboard, frozen or dried pulp laps, roll and sheet stock, in such a way as to greatly reduce their resistance to hydration when they reach the beater. It gives the beater an economical lift.

Our Shredders are built in sizes with spouts ranging from 18″ to 45″ wide. We will be glad to quote you on any size adapted to your requirements.

We also build a 100% efficient "Hog" to reduce pulp mill bark and wood refuse.

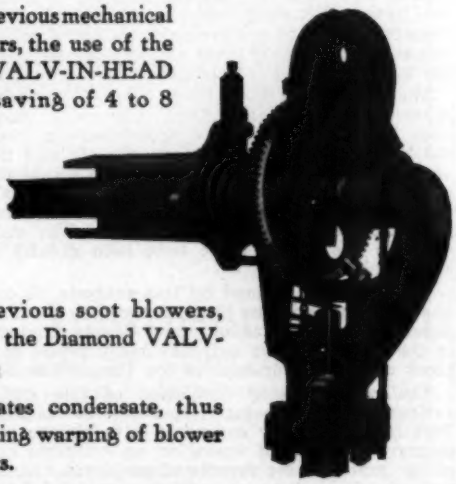
MITTS & MERRILL

1013 Tilden Street, Saginaw, Mich.

Five outstanding reasons Why you should install Diamond Valv-in-Head Soot Blowers

As compared to previous mechanical soot blowers the Diamond VALV-IN-HEAD possesses the following distinct advantages:

1. *Labor for Operation*—A saving of approximately 50 per cent.
2. *Steam for Operation*—A saving of 50 to 60 per cent or more.
3. *Pipe, Valves and Fittings*—A saving of 50 to 66 per cent in cost of pipe, valves and fittings.
4. *Maintenance*—A reduction in annual charges of 25 to 50 per cent or more.
5. *Efficiency*—Greater cleanliness of boiler assured.



As with previous mechanical soot blowers, the use of the Diamond VALV-IN-HEAD effects a saving of 4 to 8 per cent fuel and increases overall boiler efficiency.

Unlike previous soot blowers, the use of the Diamond VALV-IN-HEAD:

A. Eliminates condensate, thus preventing warping of blower elements.

B. Eliminates human factor, so that improper operation is practically impossible.

C. Eliminates binding of head or blower element, as a floating mechanism and ball thrust bearings are provided.

Remember that Diamond blower elements used in the hot passes of water tube boilers are CALORIZED. This special process—an invention of the General Electric Research Laboratories—prevents oxidation at high temperatures, and prolongs the life of the elements five to twenty times or more.

Write for Bulletin 297

DIAMOND POWER SPECIALTY CORPORATION
Detroit-Michigan

Diamond
VALV-IN-HEAD SOOT BLOWERS

now for various purposes, but even experts often do not know how they are manufactured. The chief place of making is in a suburb of Berlin which was recently visited by the society of Berlin bookbinders, boxmakers and printers. The manufacturing process is protected by patents. The above society had a good chance to watch the process of which some data may be of interest.

At first the pattern is designed and cut out in felt. These felt stamps are glued on wodden rollers and printed upon rolled cellulose paper with brown liquid wax, in a special machine. The printed sheet passes through a water bath by which—similar to lithographic printing—the grease of the wax is separated from the rest by the water, thus a melting or spoiling of the imprint is avoided. The printed paper is cut in sheets and made crispy like crape by a special device. Folds, tears and scars thus appear in the wax layer and the former assumes color in the following painting process with the sprayer tool. The paper shows a delicate colored pattern after the washing out which, however, never becomes boldly visible, but only faintly and thus looks unusually attractive and peculiar. The sheets are then dried and ironed.

The interesting thing is that it is done partly by hand, partly by machinery and the latter had to be designed almost new in order to enable a profitable and yet uncommon production. The tears and scars mentioned above are of course different on every sheet while the main design printed on each is identical and this feature makes the effect so peculiar. Wherever stress is laid upon an attractive and colored packing or outer appearance this Java paper is widely used.

Hoover on Trade Association

Declaring that the trade association as a facility for the promotion and self-regulation of industry and commerce has become, by reason of its scope and activity, an important American business institution, with which the public, generally speaking, is little acquainted, Herbert Hoover, Secretary of Commerce, in the introduction to that Department's new book entitled "Trade Association Activities" released recently, expressed the opinion that the constructive purposes of these organizations have unfortunately been confused with the minority of activities which have been used as a cloak for action against public interest.

"Just as a business house or an individual meets its obligations and carries on its daily relations within the community, so the trade association has a real individuality in the business fabric," according to Secretary Hoover.

"All trade association activities are not good, just as all individual habits are not good until so proved by their reactions on the individual and the community," the Secretary says, adding that "perhaps the best way to guide activities into the most constructive and profitable channels is through thoroughgoing analysis and examination of those activities which seem on the surface to be constructive in their application and results."

Waste elimination, in a vast area of problems, can only be accomplished by collective action in a trade. Hundreds of millions of dollars have been saved through the adoption of principles laid down in such programs, not alone to the business groups concerned but to the ultimate consumer. They have brought about lower prices, through attacking directly the costs of raw material, inefficient plant operation, and unnecessary stock maintenance.

American Paper and Pulp Association to Compile Statistics

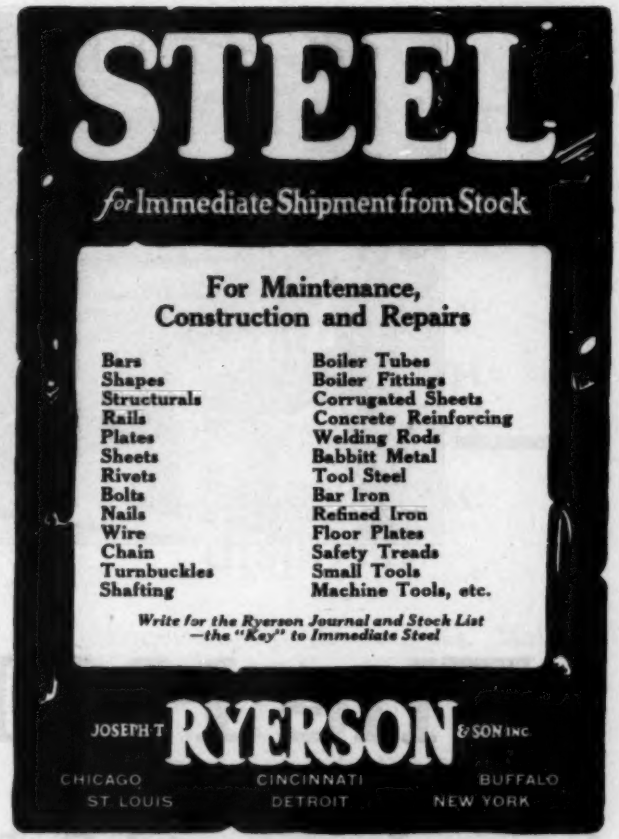
The American Paper and Pulp Association has taken over the task of collecting statistics on the paper industry, abandoned by the Federal Trade Commission. This was the announcement made to the paper industry recently by Dr. Hugh P. Baker, Executive Secretary of the Association. Plans are now being formulated for doing this work.

The success of the effort will be dependent, of course, upon the co-operation of the mills of the country, but as they have previously reported to the Federal Trade Commission, it is not thought likely that they will be less willing to file the same statistics with an organization of their own industry.

The governmental form of report will be used in making reports to the Association, the only difference being that the report blank will carry the name of the American Paper and Pulp Association instead of the Federal Trade Commission.

The details of the collection of the statistics are rapidly being worked out but of course there will be some delay in getting out the figures for June.

Inasmuch as the American Paper and Pulp Association is a federation of associations representing the different paper



Steel Plate Construction
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Steel River Barges and Plate Work of all Kinds
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CRESCENT BELT FASTENERS
They Insure Full Power Transmission
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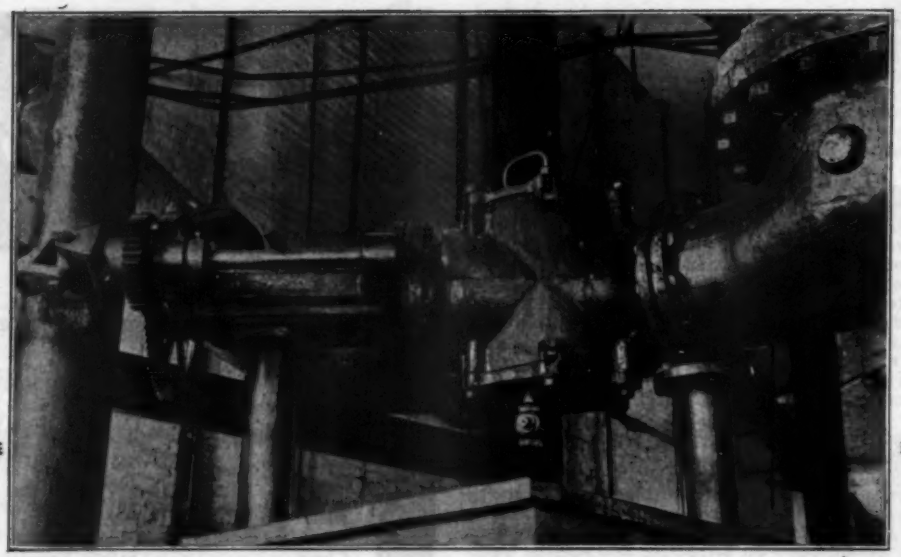
CRESCENT BELT FASTENER CO.



The HORKMAN

Improved Safety Blow-Off Valve (pat.)

The illustration above shows an actual and a very satisfactory installation of a Horkman Safety Blow-Off Valve. This is in the Wisconsin Rapids Plant of the Consolidated Water Power and Paper Company.

Let us mail you more detailed specifications.

Henry Horkman NEENAH WISCONSIN

making groups, the collection of the statistics will be done as far as possible through these group association, and the News Print Service Bureau which, as it includes Canadian mills also, is not a member of the American Paper and Pulp Association. The newsprint figures will be furnished the American Paper and Pulp Association through the News Print Service Bureau, exactly as is planned for the Association's affiliated groups.

This method of collecting the statistics, therefore, will avoid the duplication of reports by mills belonging to the group associations, but will continue the same form of reports previously made by the outside mills to the Federal Trade Commission. To this extent the collection of the statistics by the American Paper and Pulp Association will be a simplification of the previous method of compiling production figures for the industry.

Chemical Exposition Plans

Exhibitors are called upon to furnish motion pictures of a technical nature for the 1923 Chemical Exposition, which will be held at the Grand Central Palace, New York City, during the week of September 17th to 22nd. The management desires to procure films covering some phase of the chemical, chemical consuming, equipment, or allied industries.

About fifty American manufacturers of fine precision instruments of various types all the way from high pressure gauges to ultra fine chemical balances, will show their goods at this year's Exposition, according to early estimates. More than an equal number of manufactures of all kinds of chemical and allied plant equipment such as centrifugals, screens, crushing machinery, pumps, acid-proof ware, valves, gears, pipes, drying equipment, filter presses and the like, will show their goods.

Tickets for the Exposition will be sent to exhibitors not later than August 20th. Exhibitors have been requested to distribute the tickets with care so as to reduce the non-chemical element attending the Exposition to a minimum. Owing to the crowding at the Exposition in the past years during the last 3 days, the first 3 days of the week are suggested as the best time to view the exhibits in comfort and to avoid the crowds. Likewise it is suggested that visitors attend in the afternoon in preference to the evening.

National Safety Council to Meet in Buffalo

The Twelfth Annual Congress of the National Safety Council will be held at the New Statler Hotel in Buffalo, N. Y., during the week of October 1 to 5.

Several prominent doctors and public officials will speak on the Safety Problem. A complete educational exhibit demonstrating the work done among public schools during the past year has been arranged by the Education Section of the National Safety Council. A safety playlet—a scene in a foundry—will be staged by steel workers of the Carnegie Steel Company.

Paper and Pulp Section Program

Tuesday, October 2, 10 A. M.

1. "Value of Physical Examinations in Paper and Pulp Mills," Seth L. Bush, Crocker-McElwain Companies, Holyoke, Mass.
2. "Safeguarding Our Workers," Dr. Hugh P. Baker, secretary American Pulp & Paper Association.
3. "The Paper and Pulp Mill Safety Code," discussion led by Robert M. Altman, Marathon Paper Mills Co., chairman, Paper and Pulp Code Committee.

(Copies of this proposed National Code, for which the National Safety Council is sponsor, are obtainable from the Council on and after Sept. 1.)

4. Round-table on Paper and Pulp Mill Hazards, including (a) Prevention of slipping on wet floors; (b) Safe handling of material.

Records Broken

All previous records in planting forest trees on private land were eclipsed during the spring season just passed. The increase in reforestation by individuals and corporations is proof of a growing conviction on the part of landowners of the necessity for planting forest trees on idle land to provide future timber. It is also an indication that the profits to be derived from reforestation are appealing more and more to the people.

A record of trees planted in New York since 1911 on public and private land is interesting in that it shows the active and inactive localities in this conservation work. The total number of trees planted in the State of New York since 1911, as far as it is possible to tabulate them, is 56,691,691. During the war, reforestation fell off perceptibly but has recov-

Paper Machinery and Equipment

at

Old Hickory Powder Plant now released *for* immediate disposal

20 Mammoth Jr. Jordan Engines. Maker Noble & Wood Co. Shell 5 ft. 6 in. long, with 10-in. inlet and 6-in. outlet. Capacity, 30 tons per 24 hours. Will run either direction at 350-375 R. P. M. Fitted with steel bar knives, block and oak fillers.

39 Welded Steel Digesters. Maker, Continental Iron Works. Capacity, 1300 cu. ft. Inside diameter, 8 ft. Length, overall, 27 ft. Working pressure, 110 lbs. per sq. in. Tested 165 lbs. per sq. in. Each digester complete with cast iron supporting ring, hoppers, guides, and all accessories.

1000 Steel Tanks, capacities, 100 to 55,000 gallons.

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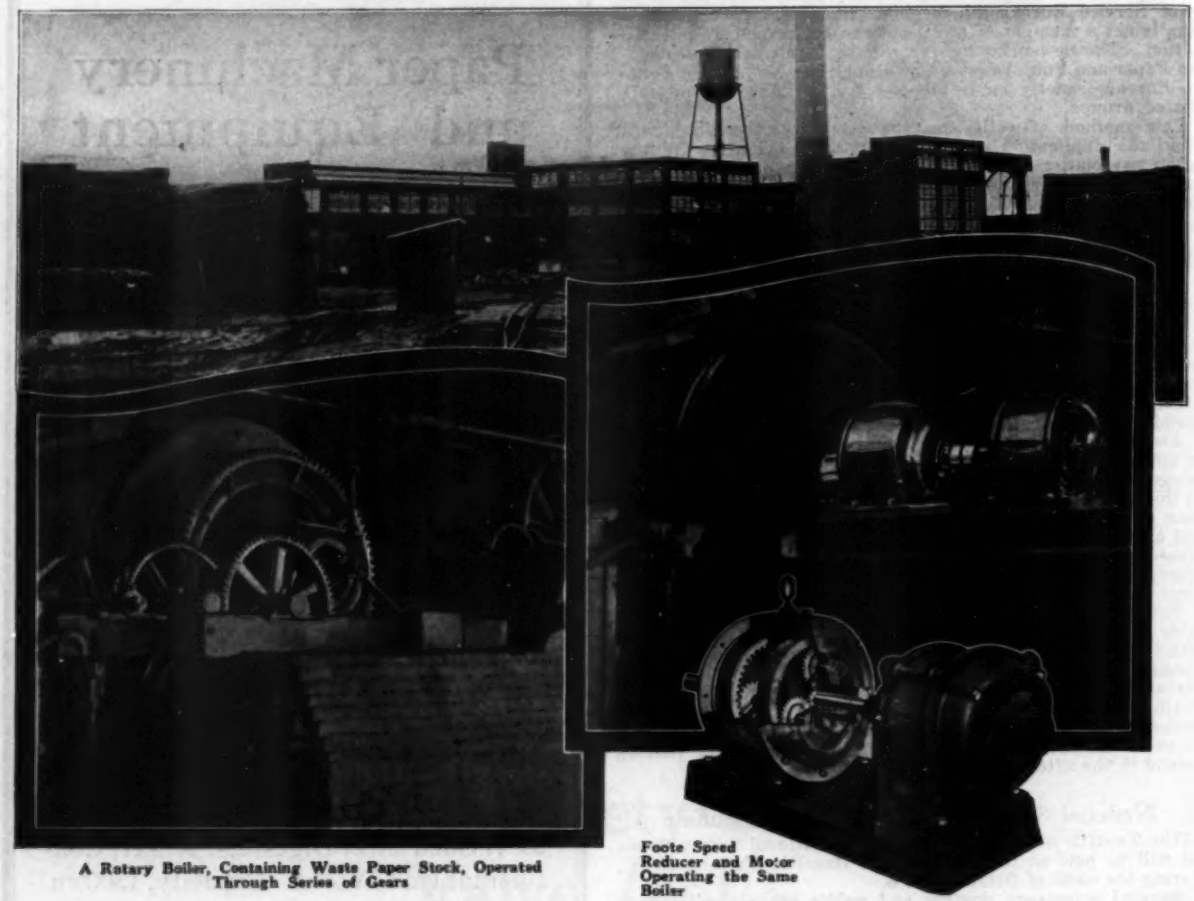
Old Hickory Powder Plant

Jacksonville, Tennessee

B. P. MORSE and W. P. SMITH, Receivers



A Rotary Boiler, Containing Waste Paper Stock, Operated Through Series of Gears

Foote Speed Reducer and Motor Operating the Same Boiler

Your Equipment Needs This

Wherever a reduction in motor speed of 3 to 1 or more is necessary Foote Speed Reducers will do the work at a saving in installation cost, operation cost, maintenance cost, replacement cost, and power cost.

Foote Speed Reducers replace open equipment such as belts, chains, ropes, open gearing, etc. Because they are entirely enclosed with all moving parts running in oil, they deliver from 86 to 94% of the motor power, provide positive safety to workers, and give uninterrupted service.

They are ideal for use on storage tanks, mixers, conveyors, and other paper mill equipment.

Tell us about your equipment and let our engineers show you why you need Foote Speed Reducers.

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FOOTE BROS. GEAR & MACHINE COMPANY

Manufacturers of Rawhide and Bakelite Pinions and Cut Gears of All Kinds.
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ered and this spring broke all records with regard to private land. The addition of trees to be set out this fall will undoubtedly bring the total for the year beyond all previous planting operations on both public and private holdings.

Every county in the state has planted trees. Such counties as New York, Kings and Queens in the heart of the metropolitan district have planted many trees. The counties of the Adirondacks and Catskill regions where large tracts of state land are located have the highest records. Franklin county leads with 13,503,000; Essex comes next with 5,999,000 and Orange county third with 3,229,000.

Mills of American Strawboard Sold

The American Strawboard Co., which for a year has been in the hands of a receiver was sold at auction July 18, in the United States District Court in Chicago. $1,588,300 was the total bid for the fine mills beside contracts for two other mills and the real estate of the company.

Mr. E. P. Lannan, representing the Quincy North Star Co., manufacturers of egg case fillers, bid $1,115,000 for two mills and the company and the contracts for the other two. These mills included the strawboard mills at Noblesville, Ind., and Quincy, Ill., having a combined daily capacity of 75 tons. The contracts purchased were made last February between the American Strawboard Co. and Smith, Palmer and Hawkins, wherein the latter agreed to purchase the mills in both Piqua and Tippecanoe, Ohio.

H. A. Couse, representing the Mineral Electric Co. of Cleveland, purchased the straw and chip board mill at Circleville, Ohio, with a bid of $200,000. Mendelson Bros. Paper Stock Co., Chicago, bought the liner and chip board mill at Wilmington, Ill., for $250,000.

N. H. Carpenter, of the Coshocton Straw Paper Co., bought the chip and newsboard mill at Winchester, Va., for $20,000. Real estate property in Tiffin, Ohio, was sold for $15,000.

It is announced that the bankrupt company can now pay creditors one hundred cents on the dollar.

Germany Increases Paper Exports to Mexico

Thirty-nine per cent of the paper imported to Mexico during the present year is from Germany. Comparing this with statistics obtained from the year 1922 when the paper imported from Germany only amounted to 17 per cent of the total paper imported, it is seen that Germany is partially regaining her pre-war trade, at least in the paper industry.

Imports of paper from Germany are said to be mainly of cheap quality. This report is confirmed by the customs valuation of 13 cents per kilo during the first four months of 1923, compared with 32 cents in 1922 and 20 cents in 1909-10. Imports from the United States have fallen from 66 per cent in 1922 to 51 per cent in the first four months of the current year.

German paper imports during the period January to April represented nearly 80 per cent of the imports from the same source during the preceding months and if entries continue at the same rate during the remaining 8 months they will equal more than twice the entire sales for 1922.

Report of the United States Coal Commission

The United States Coal Commission has arrived at the following conclusions, after an eight months' investigation of the coal industry:

1. That the country's anthracite resources are one-third exhausted.
2. That the anthracite industry is controlled both as regards ownership and labor by a comparatively few persons.
3. That from 15 to 32 per cent of the consumer's dollar goes to the local dealer and only from 45 to 60 per cent to the producer.
4. That there is a constant danger of an interruption of the country's anthracite supply which, in fact, is not keeping pace with demand.

The Commission also finds that government ownership is not a remedy to the problems of wages, hours, costs, etc., but recommends that the president be given authority to operate the mines in case of emergency.

Old Newspapers Wanted in Hongkong

A considerable trade is done in Hongkong in the sale of old newspapers, which are used by the Chinese for wrapping purposes, says Consul Leroy Webber in a report to the Department of Commerce. The imports vary from 4,000 to 7,000 tons per annum, the United States supplying on an average of 98 per cent of this amount and the balance coming chiefly from the Philippines and Canada. The greater por-

AMERICAN JOINT

Leather Link Belting
for
Winders and Reels

American Patent Joint Leather Link Belting is made to stand the "gaff" of the winders and reels—the slippage that so quickly burns up the best of flat belts on these drives.

This belting is carefully made of the best leather and is thoroughly waterproofed for wet service.

If you are not acquainted with our link belt send for sample and price list.

Chas. A. Schieren Company
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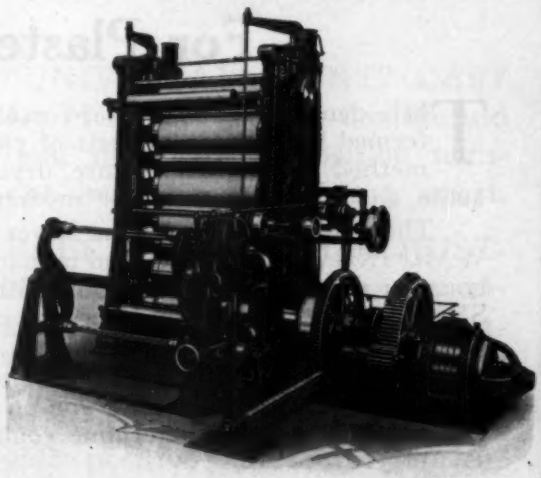
22 Ferry Street, New York, N. Y.

NORWOOD
SUPER CALENDERS



WE ARE SPECIALISTS IN
Paper Finishing Machinery

NORWOOD ENGINEERING CO.
FLORENCE, MASS., U. S. A.

The Coe Automatic Roller Dryer

For Plaster Wall Board

THE demand for wall board made of Gypsum Plaster or other composition formed between two sheets of paper is constantly increasing. The old slow method of low temperature, drying on racks in tunnel kilns is proving inadequate and unsatisfactory, for modern plants.

The new COE Continuous Dryer will dry these boards perfectly FLAT, no WARPING or PEELING, and in many cases the drying time is reduced from twelve hours or more to about one hour, with utmost economy of POWER, LABOR and SPACE. We can furnish dryers for capacities up to 250,000 square feet per day, eliminating all trucking or handling.

If you have a board drying problem to solve, write us for information and we will be glad to make tests for you on our large experimental dryer if necessary to get accurate data, or determine commercial possibilities.

THE COE MFG. COMPANY

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Eastern Representative
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New York City

tion of the imports are sold to the nearby markets of South China, Indo-China, and Siam.

Imports are generally made in bales of 200, 280, and 560 pounds, bound with iron hoops and entirely free from magazines or catalogues. Quotations are generally given c.i.f. Hongkong, although some firms buy f.o.b. Payment is usually made on the basis of cash against documents or upon arrival of the goods. The retail price depends on the market price in the United States, Hongkong prices being generally about 10 per cent above the former. At present writing the current price is $95.00 gold per long ton.

Hongkong being a free port, no duty is charged on this class of merchandise, although a 5 per cent ad valorem duty is charged on all goods entering the Republic of China.

Throwing Money Away

Do you guarantee return postage on your third-class mail matter, if undelivered. If you don't you are literally throwing a large part of your advertising appropriation away.

In the Chicago post office alone, thousands of letters, mostly circulars, are destroyed every day.

No one can reckon just how much money is needlessly lost through the carelessness of advertisers in not guaranteeing return postage. If it were possible to determine the exact value of each piece of mail destroyed every day in the post offices of the United States, the amount of money represented would be stupendous and no doubt would run into the thousands of dollars.

To protect yourself from losing money this way, be sure that you guarantee return postage on all your third-class mail matter.

Combat Pulp Wood Shortage

"The committee for the perpetuation of the paper industry of the United States" has been formed as a result of the threatened Canadian embargo. This committee is composed of leading paper manufacturers of whom Mr. Henry W. Stokes of the York Haven Paper Company is president.

A discussion of the problems relating to the threatened paper shortage which might arise, if the embargo is put into effect, and recommendations as to the relief of this shortage is the object of the committee.

Orton & Steinbrenner Company Reorganizes

A reorganization of the Orton & Steinbrenner Company of Chicago, Ill., manufacturers of locomotive cranes, dipper shovels, and grab buckets has been made due to the resignation of H. G. Steinbrenner as president and the disposal of his interest in the company.

The following officers have been elected:
P. A. Orton, president and general manager.
E. B. Ayres, vice-president.
Herbert Mertz, secretary and sales manager.
Harry Shaffer, treasurer and purchasing agent.
G. L. Niederst, chief engineer, and
Alex Orton, works manager.

No change in control, policy, or management has been affected by this reorganization.

The du Pont Company has been granted a patent on an apron for a paper manufacturing machine which is used in conducting the paper stock from the flow-box onto the machine wire. This apron is made from a coated fabric, known as fabrikoid, which has been impregnated on both surfaces with pyroxylin. It has been thoroughly tested in several large paper mills and has been found more convenient and more economical than the apron materials previously used. The pyroxylin impregnation of the fabrikoid apron renders it thoroughly waterproof and very resistant to chemical action. It is stated that fraying is almost impossible as the fibres are so closely interwoven and the pyroxylin becomes such an integral part of the fabric that it can stand a maximum amount of wear, and abrasion. Buckling is reduced to a minimum.

The Diamond Power Specialty Corporation of Detroit has recently made a number of connections for the sale of Diamond Soot Blowers, Burford-Hall & Smith, American Trust and Savings Bank Bldg., Birmingham, Ala., will represent the company in that territory. The Boiler Equipment Service Company, Candler Bldg., Atlanta, Ga., are representatives in Georgia and Florida. Paul E. Theis has been appointed sales manager of the Cleveland district, with offices at 608 Rockefeller Bldg.

THE "UNIVERSAL GIANT" CAST IRON DROP HANGER

"UNIVERSAL GIANT" CAST Iron Hangers are non-flexible and hold the shaft in position without bending or working apart.

BALL and SOCKET ADJUSTMENT reduces friction and insures perfect alignment of shafting.

RING OILING BEARINGS provide positive automatic lubrication.

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Oxford Paper Company

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Executive Offices
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Manufacturers of

High Grade Machine Finish and Super-Calendered Book, Lithograph, Envelope and Tablet Papers

and

"Polar," "Hi-Tone" and "North Star" Coated Book Papers; also Coated One or Two-side Lithograph and Cover

Capacity of Mills: 350 tons of Paper, 150 tons of Soda Pulp, 100 tons of Sulphite Pulp per day

New England

Boston, August 1, 1923.

July was a poor month, generally speaking, for the New England paper trade, but August promises to show a definite improvement which has already been manifested by a striking increase in the unfilled tonnage of paper board mills and a generally improved demand for book paper. The strike at Holyoke of the Stationary Firemen's Union has crippled a large part of the fine paper industry of the country, for all the mills of the American Writing Paper Company as well as those located in Mittineague, Mass., are down. As a matter of fact this does not trouble mill officials greatly for the fine paper market can easily stand this production curtailment at the present time.

Another factor that points to improvement in the book paper and board mill division of the industry is the very heavy demand and the steadily advancing prices of mixed papers, folded news, and old book stock. These grades have increased from $4 to $8 per ton since the low point in the market was reached early in July. At this writing, mixed papers are bringing $18 to $19, f.o.b. Boston, and folded news have sold at $21 to $23, f.o.b. this city. The New England paper stock packers have added very heavily to their stocks of No. 1 books and magazines at the low market in early July when books were selling at $1.60 per hundred pounds. They have already reaped a profit from that with sales at $1.85 to $1.95, f.o.b. Boston, and the market steadily pointing higher. The big Fitchburg, Mass., book paper mills, which are among the chief suppliers of the Curtis Publishing Company have been operating at capacity or very near it throughout the dull period.

Crocker-McElwain Company of Holyoke, Mass., well known fine paper and paper board makers, have filed a certificate with the Massachusetts Commissioner of Corporations showing an increase in capital from $1,250,000 to $1,750,000 by the issuing of 5,000 additional shares of common, par $100. After the increase, the company will have 2,500 shares of preferred, par $100, and 15,000 shares of common, par $100. The 5,000 new shares of common are to be issued to the common stockholders of the Chemical Paper Manufacturing Company, of Holyoke, in exchange for their common stock in the ratio of two shares of Chemical Paper for one share of Crocker-McElwain.

Eastern Manufacturing Company, famous makers of "Systems Bond," at South Brewer, Me., report a very satisfactory first half year. The stocks and bonds of this concern form some of the active issues on the Boston Stock Exchange. The company earned $16.50 on the first preferred and allowing for dividends on both classes of preferred shares earned a balance of $2.14 for the common. In the second quarter of the year, paper orders were but 60 percent of the demand for the January-March period which was abnormal. During the last three weeks, substantial improvement in paper orders is reported. Sales of pulp have shown a steady increase each month of the year.

Charles R. White, for many years secretary of the Eastern Paperboard Manufacturers Association as well as the Boxboard Manufacturers Association, has founded a new organization to be known as the Boxboard Research Bureau, which will be operated under the supervision of experts of the Babson Institute at Wellesley Hills, Mass. This bureau will have headquarters in Mr. White's offices in Washington, and a local office at Wellesley Hills, as mentioned, will also be maintained. Vital statistics of the board industry, such as stocks of waste paper on hand, unfilled tonnage on mill books, tonnage produced each week and new business each week will be collected from mills agreeing to make these reports. The service offers something decidedly new and its progress will be watched with interest.

Captain Jim Ross, well known paper maker, entertained a group of the Boston Paper Trade Association on board his yacht, the Valda, on Thursday, July 19. The beautiful 80 foot cruiser sailed down the north shore to Marblehead where an excellent meal was served from the galley of the boat, the return trip being made in the evening. The guests were deeply touched by the sight of the many crippled children on board the Boston Floating Hospital in the harbor, and a collection was taken for the benefit of the hospital.

The Hollingsworth & Vose Company continued to pursue their happy policy of knitting together by social activities the relationships of office and mill. The employes of their

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Machine Knives
FOR
Paper and Pulp Mills

Highest Quality—Finest Steel—More Production

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SIMONDS SAW AND STEEL CO.
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Single, Duplex, and Diagonal

CUTTER KNIVES
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LAWRENCE, MASS.

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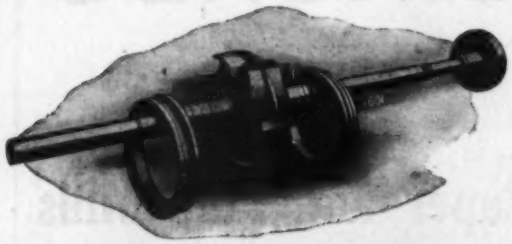

If you wish to pump liquids containing solids, submit full particulars, so that our Engineering Department can supply estimates with guarantees. Ask for Catalog B 82

IT IS NO LONGER necessary to use inefficient centrifugal pumps merely because they are simple and easy to clean. The efficiency of the De Laval open impeller shown compares favorably with that of closed impellers. For example, in a recent test an 8-inch pump, driven by synchronous motor, showed an efficiency from wire to water of 64% and a 10-inch pump an efficiency of 66%.

This open impeller was designed to handle paper pulp and liquids containing rags, wastes, etc., that quickly plug a closed impeller. It gives practically no trouble from clogging under the most adverse conditions.

The pump shaft is encased in bronze sleeves and also protected by stationary sleeves to prevent strings, rags, etc., from wrapping around it. The knife-like sides of the impeller blades, running close to the side plates, shear or cut stringy materials.

The pump runs at speeds which permit direct connection to standard speed motors.

Both suction and discharge connections are in the lower part of the casing, and all internal parts are at once accessible upon lifting the casing cover and can then be removed after loosening the bearing caps. The parts are manufactured to limit gages on an interchangeable basis, and replacements can be made by men of ordinary intelligence.

De Laval Steam Turbine Company, Trenton, New Jersey

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THE JOHNSON FRICTION CLUTCH

Single Clutch Showing Working Parts

Is the Smallest and Most Compact Clutch

IT IS VERY POWERFUL FOR ITS SIZE

NOTE CONSTRUCTION—THE SLEEVE CARRIES A CURVE-SHAPED WEDGE WHICH SPREADS THE LEVERS WHEN SLEEVE IS MOVED FORWARD AND THE LEVERS BEING FULCRUMED IN THE RING, EXPANDS THE RING INSIDE THE CUP. THE FRICTIONAL CONTACT DRIVES THE CUP ON THE HUB OF WHICH CAN BE MOUNTED STANDARD STEEL SPLIT PULLEYS, CONE PULLEYS OR SOLID IRON PULLEYS FOR SHAFTING DRIVES. FOR SHORT CENTER DRIVES, SPROCKETS ARE USED.

WHEN INSTALLED ON MACHINERY GEARS ARE MORE OFTEN MOUNTED ON HUB.

WRITE FOR CATALOG "PI."

THE CARLYLE JOHNSON MACHINE CO. MANCHESTER CONN

West Groton and East Walpole mills met at East Walpole, Mass., on Saturday, July 14, for the annual outing. A ball game between teams representing the two mills was won by East Walpole at 7 to 1. The teams are playing for a cup presented by Mrs. Valentine Hollingsworth, wife of the president. In the evening a banquet at the Bradbury Lewis Hall at Walpole was enjoyed by 325 officials and employes of the company. The fraternal spirit is displayed at these gatherings which have gone far towards making the employes of this concern one of the most loyal groups of paper mill workers in the country.

A detailed program of the fall meeting of the Northeastern Division of the American Paper and Pulp Superintendents Association, will be published in the course of a few weeks. In order to make the meeting of the greatest interest to a majority of the members, the Committee on Arrangements has sent out a questionnaire asking the members what subjects of the manufacture of paper and pulp they would like a paper read on. The fall meeting this year will be held at Groveton, N. H., on Saturday, October 6. To reach Groveton a trip through the White Mountains will be necessary and the mountains will be clothed in the beauties of autumn, a long remembered sight.

The Intercoastal Steamship Companies, operating between Boston and Pacific Coast ports, via the Panama Canal, have come to an agreement on freight rates. Hitherto keen competition between them which in shipping circles became so bitter as to be known as a "rate war" was instrumental in bringing rates of paper shipped from New England mills to the Pacific Coast to extremely low levels compared to transcontinental ocean rates. The last rates were 45c per hundred pounds, but on August 1st they became 65c per hundred pounds. These rates govern all classes of paper including fine writings, news print, board and wrapping.

The Tileston & Hollingsworth Company, of Mattapan, Boston, Mass., are installing a new Fourdrinier which has been built for them by the Rice Barton & Fales Company, of Worcester, Mass. This machine will take the place of an old one in the plant. The new machine is equipped with every possible modern device and its up-to-dateness drew visits of inspection from paper mill superintendents from all over New England. The new machine will be in operation by September 1. We understand it will have a capacity of 30 tons per day.

Of chief interest at this time in New England is the reported reorganization of the American Writing Paper Company finances in order that the company might have larger working capital at its disposal. While there is no pressing need, working capital has been depleted considerably in recent years and is now at $4,000,000, the lowest it has been in years. Means for providing additional working capital have not been decided upon.

The Eastern Manufacturing Company in 1924 will be on a self perpetuating basis insofar as the all vital raw material pulpwood is concerned. They will in 1924 be planting as many trees as they cut each year, which in addition to natural growth is expected to more than offset loss from fire and insects and to provide a perpetual source of spruce pulpwood. Their timber is consolidated on the headwaters of the Penobscot River.

Fire caused a damage of about $40,000 to the mill of the Davis Paper Company at West Hopkinton, New Hampshire, destroying two storehouses containing 500 tons of paper and paper board and other buildings of the company. They plan to rebuild immediately. An excellent sprinkler system in the main mill extinguished several fires which started there during the conflagration. The mill produces chip and filled news board.

Thomas A. Watson, 44 years of age, and for many years office manager of the Judd Paper Company, of Holyoke, died suddenly on the morning of July 10 in a restaurant in Holyoke. An autopsy performed later disclosed the fact that death had been caused by acute dilation of the heart. Mr. Watson was born in Holyoke and attended schools there. Upon graduation he entered the employ of a paper company and had been connected with the paper industry ever since.

Imports of wood pulp at Boston from Scandinavian ports are showing a rapid increase after several months of comparative quiet. The following boats are scheduled to arrive

Industrial Leaders Favor Godfrey Equipment

WHEN a firm like the Van Camp Company buys machinery of any kind you may know that its purchase has been the result of a thorough investigation.

Organizations of this caliber are not content with mere specifications and promises of satisfactory performance. They insist upon seeing the machine in actual operation, doing the same work that will be required of it when installed at their plant.

And that's exactly what the Van Camp Company did when they adopted the *Godfrey Conveyor* for the handling of coal and ashes at their great plant in Indianapolis. Their engineers visited other plants equipped with the *Godfrey*, watched it unload coal from hopper-bottom cars, timed its delivery to bins and boiler room, compared it with other types of equipment—and then placed their order. You, too, will find the *Godfrey* a safe investment and one that will yield substantial dividends. You, too, can profit by the experience of others in choosing your coal and ash handling equipment. We'll gladly tell you who has the *Godfrey* nearest you.

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GODFREY CONVEYOR COMPANY

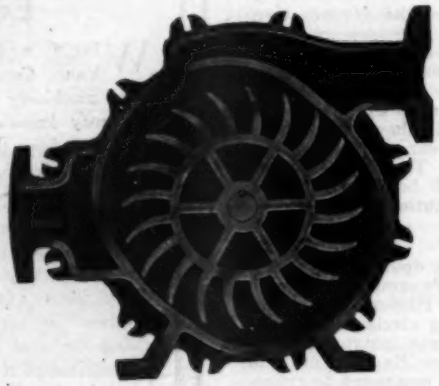
Elkhart, Indiana, U. S. A.

THE HYTOR VACUUM PUMP FOR FLAT BOX SERVICE

Vacuum Produced Absolutely Without Pulsation

No Vibration

Saves Wires



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No Rods, Pistons, Crank Shafts, Loose Moving Parts, and No Gears

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Two 600 Ton Southwark Pulp Presses. Part of a Battery of Six Southwark Machines Installed at the Backus-Brooks Co., Kenora, Ontario

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PULP, SULPHITE AND BALING

Hydraulic Accumulators, Pumps, Valves, Fittings, Etc.

To plants which operate their own machine repair shops or which have an industrial railroad, we offer a large variety of hydraulic and power tools, such as punches, shears, bending rolls, riveters, etc., for sheet metal work; Hydraulic broaching and bushing presses for general machine repair; Wheel presses for railroad rolling stock, etc.

Southwark Foundry and Machine Company
PHILADELPHIA, PA.

Swetland Building
CLEVELAND

Fisher Building
CHICAGO

during August with full cargoes: the "Puget Sound" on August 1; the "Gustafsholm" on August 4; the "Malta Maru" on August 5; the "Hickman" on August 15; the "Noruega" on August 15; the "Frode" on August 16; and the "Ivar" on August 25.

Record Load of Pulp Wood

What is believed to be the largest load of pulp wood ever hauled in Maine was taken from the woods at Venture Brook, near Dennysville, Maine, last March.

The load contained 12 cords and 3 feet by actual measurement and was estimated to weigh 23 tons. The largest load of pulp wood previously reported measured about 11 cords.

The B. D. Rising Paper Company, of Housatonic, Mass., well known makers of fine writing paper have given out officially the usual return to business activity will probably develop shortly after the 1st of September. They find the paper business of the Bershire Hill district operating about 75 percent of capacity.

C. H. Dexter & Sons, well known paper manufacturers of Windsor Locks, Conn., are having an addition built to their mill on the river side to give more room for beaters and washers. These will be located on the ground floor. Three floors above will be used for storage and other purposes.

Additions are being made to the grinder room of the Great Northern Paper Company at Madison, Me. Extensive improvements and changes will be completed by the end of September it is hoped .

The building used in recent years at Hallowell, Me., by the American Glue Company for the manufacture of strong papers for sand paper making, will be soon sold at auction.

Kerr Turbine Company Reorganizes

The Kerr Turbine Company of Wellsville, N. Y., has just undergone a reorganization through the acquisition of practically all its common stock by new interests.

Mr. Paul B. Hanks, the former president, having disposed of his holdings, has resigned and has been succeeded by Mr. W. T. Hamilton of Pittsburgh, Pa. Mr. Hamilton has associated with him a number of well known engineers and experienced manufacturers.

Ample capital for expansion has been put into the business of a sufficient amount to take care of all the present and future requirements enabling the company to take care of any volume of business that may be developed in its line of manufacture.

Department of Agriculture Issues Forestry Report

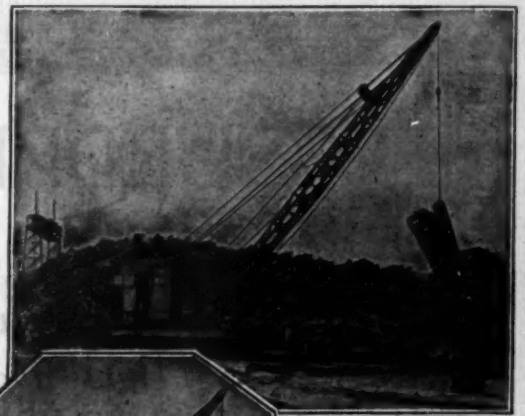
The Forestry Service has recently compiled an interesting and instructive report on the timber problem in the United States. "Timber: Mine or Crop?" is the heading of this report.

Numerous tables, maps, and illustrations are used to show the growth and consumption of the forests in the United States during the past decade. The work of the Forestry Department in making preparations to relieve the timber shortage, which is certain to occur unless steps are taken at once to combat it, is also detailed in this report.

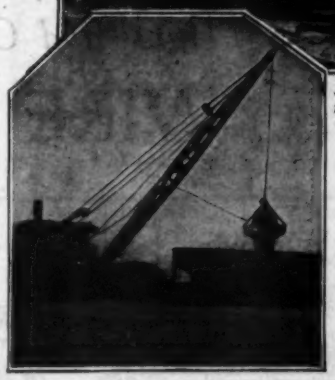
Copies of this publication may be procured by applying to the Superintendent of Documents, Government Printing Office, Washington, D. C.

Paper mill specialists of the General Electric Company held their annual engineering conference at the headquarters works in Schenectady, N. Y., July 10th and 11th. A feature of the two day meeting was a showing of a complete miniature electric steam boiler modeled after the full sized units made by the G-E Company and now in service in several plants. This model unit has been set up in the factory for inspection. There was also an exhibit of a complete section of the new G-E sectional paper machine drive.

As part of an agreement with the Provincial Government of Ontario for certain timber rights, an American concern is to build and operate a kraft pulp mill in that province with a minimum daily capacity of 75 tons. The plant according to a report to the Department of Commerce from Vice Consul H. S. Tewell, is to cost at least $1,500,000, one-third of the construction to be completed by June 1, 1924, and the plant to be in operation one year later. The Government reserves the right to require the construction of a kraft paper mill with a minimum capacity of 50 tons per day.



At the American Splint Corp., piling short logs 45 ft. high. Saving $16,000 yearly over hand labor



40-ton car of coal unloaded in less than 30 minutes

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Greater adaptability for all around service.

Most durable under hardest usage.

Built by specialists in the design and construction of locomotive and wrecking cranes.

Developed from experiences of 50-years of manufacture.

Horizontal engines allowing greater accessibility for adjustments and repairs.

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An exclusive test feature after completion of testing fully under actual service conditions.

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SALES ENGINEERS IN ALL PRINCIPAL CITIES

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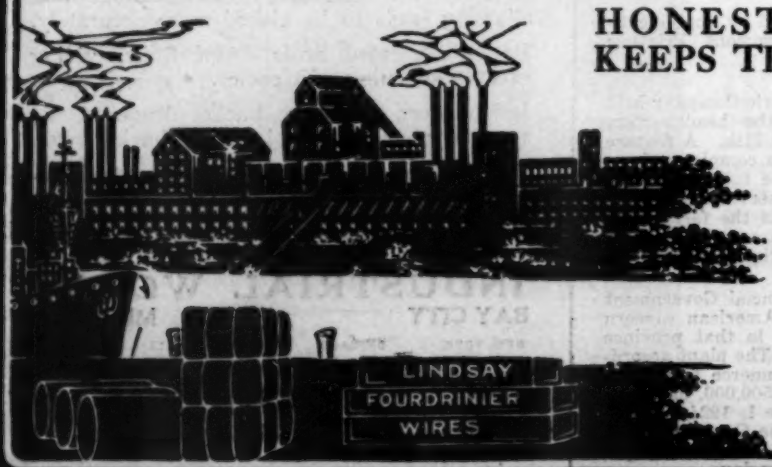
Lindsay Fourdrinier Wires

In Many Mills



HONEST SERVICE KEEPS THEM THERE

They are ready to serve you

The Lindsay Wire Weaving Company

Collinwood Sta., Cleveland, Ohio

"Ask any Papermaker"

See Miami First

FRANK SMITH, papermaker of Middletown, O., is in Europe in quest of practical ideas. Last month we took a little jaunt through the Miami Valley. As a result we felt that European paper makers might profitably come to Middletown for ideas.

We had but a very few days to visit and gossip in this quiet valley so dotted with paper mills. Doubtless we overlooked many things of interest, but feel that at least we touched the high spots and are just a little better acquainted with the paper makers of the valley.

Generally speaking, business in this region is very much as it usually is in July and the early part of August. We did not find any mill that has as yet been down, except for three or four days around the Fourth. At that time practically all of the mills took a vacation. A few of the mills are now keeping the machines busy running up a variety of stock. Others had fallen so far behind with their orders that they are taking advantage of this summer lull to catch up. All of the mills are very confident that it will not be necessary to shut down even for a few days.

It was interesting to observe the indifferent attitude of the papermakers in this part of the country toward the proposed embargo on Canadian pulp wood. No two of the ten or twelve leading paper makers with whom we talked took the same attitude regarding the situation. The only thing in common was this seeming indifference as to the outcome. This may be due to the fact that right now it is too hot down there to get "het up" about anything. More likely it is due to a faith in the American manufacturer to rise to difficult situations when these situations take place. Frankly, we wonder if these people have never heard of that "ounce of prevention."

The Wren Paper Company, Middletown, afforded us a very pleasant afternoon as well as a real practical idea. This is a little one-machine mill, a small machine at that. Furthermore, it is one of the oldest mills of the valley. It boasts of practically none of this "new fangled" or high speed equipment; and yet that little mill, in spite of hundreds of modern, high speed mills in this country, is running at a very comfortable profit. How do they do it?

As a matter of fact there was a long time when they didn't do it, for they were trying to compete with other and more modern mills. A few years ago they gave up this overpowering competition and started to specialize in blotting. Their comparatively small organization has developed to such a point that when it comes to blotting "that's what they don't know nothin' else but." They know how to make good blotting and because of their specialized effort they are making it as efficiently, in this old-fashioned mill, as anyone. Maybe this idea could be applied to some of the other numerous out-of-date mills of the country.

Jumping from the smallest mill in the valley to the largest (probably the largest in the world) we spent a morning going through the Champion Coated Paper Mills at Hamilton. This company right now is breaking ground for a new finishing room which will measure about 125 by 240 feet. The purpose of this new building is to increase the company's finishing facilities to a point where they will more easily and efficiently keep up with the output of the machines.

One thing of perhaps minor interest about this well organized plant was the method employed for handling rolls when loading the cutters, storing, etc. This work was all done by overhead cranes. The thing that impressed us about this method was the way in which rolls could be decked up several tiers high with but very little danger of breaking the edges. Furthermore, a great saving in storage space was obviously available.

The big idea, however, that we picked up at the Champion mill was in their chemical room. This is a comparatively new building and is designed to allow considerable storage space for clay, rosin and other paper making ingredients. The function of this department is to minimize the human element in mixing. Here all possible mixes are made and delivered to the beater, mixed in minutely accurate proportion. This eliminates the necessity of the beater man having to put in so much of this and so much of that, if he doesn't forget or make a mistake.

Yes, we enjoyed our little jaunt through Miami Valley, and we might suggest that if any of you paper men are planning a cross country tour this month it will be worth your time to chart your course so as to take in southern Ohio. The scenery is beautiful with paper mills at frequent intervals to break the more or less monotony of nature, and you will find everything so confoundedly old fashioned and restful down there.

Aurora Centrifugal Pumps

Type OMD

Aurora pumps are made in many types, to meet all conditions found in the paper mill field.

We specialize in horizontally and vertically split open and inclosed impeller, single and multi-stage and deep well turbine centrifugal pumps as well as deep well reciprocating pumps.

A card from you stating your conditions places our engineers at your service and results in a saving to you.

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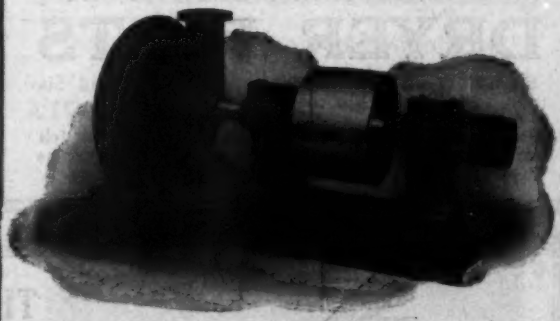
Home Office and Factories, Aurora, Ill., U. S. A.

CENTRIFUGAL PUMPS

for



Water, Acid and Stock

Manufactured By

E. M. Cross Mach. Co.

BERLIN, N. H.

DENSIMETER—A New Instrument for Paper Mills

A shop instrument for determining the density of rubber in accordance with a standard scale. Can be used in conjunction with a plastometer as its reading multiplied by two will give the plastometer reading. This is a rugged scientific instrument designed for use in the mill as well as the laboratory, and although it was primarily designed for testing rubber rolls, it may be used for testing any other rubber articles. It is suitable for testing rubber rolls in place in the machine in which they are used.

Send for Bulletin No. 124

STOWE & WOODWARD CO. The Rubber Roll Makers
Newton Upper Falls, Mass., U. S. A.

HAMILTON BOARD FELTS

Our style No. 82 top felt and style No. 87 bottom felt have the bulk of the filling threads on the face of the fabric. This style of weave causes the felts to give a smoother finish and longer service than can be secured from plain weave board felts besides shedding the water better. They do not "roll on the edge" and are billed at the same list and pound prices as our plain board felts.

SHULER & BENNINGHOFEN
Hamilton, Ohio

Fitchburg Duck Mills

ESTABLISHED 1844
FITCHBURG, MASS.
MANUFACTURERS OF
STANDARD AND MULTIPLE PLY
DRYER FELTS

English Weave in Two, Three, Four, Five and Six Ply—60 Inches to 176 Inches in Width

Fine Faced Felts for Fine Papers. Absolutely no felt marks in paper. TRIBUNE Three Ply Felts for Coarse Papers.

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EXCLUSIVE MAKERS OF

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Have You Run Them?
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Are You Interested in Accurate Running Felts?

Give Us a Trial
Get Authentic Information
Ask the Men Who Run Them

Yours for service

LOCKPORT FELT CO., Newfane, N. Y.

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SKANEATELES FALLS
New York

FELTS and JACKETS

Top and Bottom Wet Felts for board machines, with all the qualities requisite to insure long life and continuous production.

They Satisfy

California Trade Letter

San Francisco, August 1, 1923.

The trade is showing the upward tendency, naturally resulting from the growth that seems to be apparent all over the State, and every city, large or small, is making material advancement. In this respect paper, the natural thermometer of conditions, must keep pace.

Some of these activities are summed up in the following paragraphs, showing new corporations and activities of a general nature:

Southwest Board Mills incorporated for $500,000, by Meaney, Pride and Postel, of the San Marcos Building, Santa Barbara.

The United Paper Company, $100,000, incorporated by M. I. Grossman, 337 Merchants' National Bank Bldg., Los Angeles.

The Southern California Paper Stock Company, incorporated for $100,000 by Lawler and Segnan, in the Van Nuys Building, Los Angeles.

The Long Beach Paper Box Company, $10,000, Long Beach.

The Oakland Scavanger Company of Oakland, 26th and Poplar streets, to deal in salvaged paper.

Other Items of Interest

A fire of small importance was checked recently in the plant of the Oakland Scavenger plant.

Work is well under way on the new half-million-dollar plant of the Paraffin Company at Antioch. This is a concrete and brick structure and will increase the production of the plant fully fifty per cent. It is planned to have it in operation early in September. The company is an extensive user of waste paper, rag and materials of a similar nature, and as it is now adding the making of linoleum in addition to roofing stock, it will be an even larger user of waste.

Seventy-five delegates attended the Pacific Coast Convention of Paper Box Makers at Del Monte on June 24. These delegates came from all points on the coast and many from Canada.

The Emeryville plant of the Paraffine Company recently sent out from this port the largest shipment of roofing ever recorded. It consisted of fifty-one carloads and went direct by boat to Bombay, India, where it will be used on the warehouses of the Port Trust Cotton Depots.

Another item of interest that is going the rounds of the trade is to the effect that there is to be established in Oakland at an early date a factory to manufacture exclusively Egg Cases under a patented design. This business is an important one as the state stands well at the top of the list as a shipper of eggs and annually uses many million cases. For instance, the Antioch Mill has at present four egg filler machines in constant operation and during the year turned out 150 carloads of fillers.

Along the line of big paper orders, the San Francisco Postmaster recently sent in his requisition. Among other items he requested 50,000 tags, 4,000,000 index cards and other items classified as paper products.

Up in Oregon where they grow apples they have had the recurrent annual problem, in the Hood River District, of warehouse scald and the shrinkage that has meant losses of considerable magnitude. Much experimentation has resulted in solving the problem and the answer was found in using a special oiled paper and this year's crop will be wrapped in the new covering, with attendant savings.

Sam Levenson of the Crown-Willamette Paper Company was recently married. He is the sales manager of the company and will divide his time between the plant and the San Francisco offices of the company.

The Sun Maid Raisin Growers Association expended $2,000,000 for paper and paper containers and this year's estimates for this item of expense will go well over $4,000,000.

At a cost of $50,000, Scott Brothers have erected a modern factory in San Francisco at 13th and Howard Streets, to be exclusively devoted to their work in making paper boxes. The building is 109 by 118 feet. It is unusually well lighted and is a model for this class of manufacture.

New Board Mill for Los Angeles

The National Paper Products Company of San Francisco, a subsidiary corporation of the Zellerbach Paper Company, has announced that it has closed an option on property in Los Angeles, consisting of about thirty-five acres, upon which they propose to build a board mill and container factory.

The plans for this mill are now in preparation and it is expected that the construction will commence as soon as the plans can be completed and the contracts let for material and equipment.

According to present plans, this will be a one-machine mill, with a capacity of about one hundred tons per day, and will

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A SIMPLE change in the manufacturing process often results in a pronounced decrease in cost of production.

Paper Mills use Starch for sizing to produce better and stronger sheets with lower cost of manufacture.

Our SPECIAL PAPER brand for beater-sizing increases strength of sheet and gives improved finish.

Our FOX HEAD brand for top-sizing is more economical than all-glue size—gives perfect satisfaction.

CORN PRODUCTS REFINING COMPANY
17 Battery Place New York

Starch

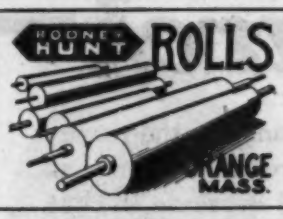
TAYLOR'S SPIRAL RIVETED PRESSURE PIPE

For many years the preferred piping in Paper and Pulp Mills

LIGHT STRONG DURABLE

Sheet Steel Fittings Made to Individual Requirements

AMERICAN SPIRAL PIPE WORKS
P. O. BOX 485 CHICAGO



SERVICE AND SATISFACTION FOR PAPER MILLS

Rodney Hunt Machinery Co.
45 Maple Street, Orange, Mass.

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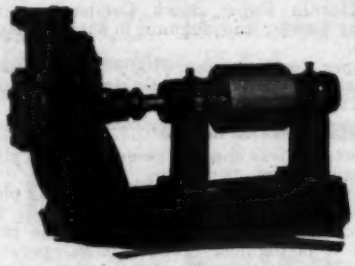
NORTHERN ENGINEERING WORKS
DETROIT, MICH. U.S.A.

Pickles' Patent
Automatic Steam Regulator
FOR
Paper Making Machines

Which absolutely control the drying of the sheet. Installed on sixty days' trial

W. F. PICKLES Buckland, Conn.

QUALITY



Quality is built right into every part of every Taber Pump. The result is the best pump it is humanly possible to make; one that always gives satisfactory service.

Submit your pumping problems to us

Builders of Centrifugal and Rotary Pumps

TABER PUMP CO.
Buffalo N. Y.
"Pump Specialists"

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TICONDEROGA, N. Y., U. S. A.
MANUFACTURERS OF
WARREN IMPROVED CALENDER DOCTORS
With Flexible Blades, Universal Adjustment and Control
(PATENTED)
WARREN IMPROVED PATENT DOUBLE DRUM WINDERS
Patent BALL VALVE Hydrant
Stock Circulating Systems *and*
other Paper Mill Specialties
SEND FOR OUR BULLETIN

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INDUSTRIAL—AGRICULTURAL—MUNICIPAL—RESIDENTIAL
A Type for Every Service
THE GOULDS MANUFACTURING COMPANY
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GOULDS

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A necessity for turbine protection, engine cylinder economy and utilization of superheat for all its benefits
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When the pins and bushings in Union Steel Chains are considerably worn on the one side they can be turned half a revolution, thus bringing their unworn sides into service and practically renewing the chain; later they can be replaced with new wearing parts at small expense. Union Steel Chains invariably give longer service per dollar of cost; that's why they are used by the leaders in all industries.

UNION STEEL SPROCKET CHAINS
The chains with the substantial links and large case-hardened bearings. All sizes and capacities from one-inch pitch to 1,000,000 pounds ultimate strength.
Roller Chains; Bushing Chains; Elevator Chains; Conveyor Chains; Barking Drum Chains; Monel Metal Chains and Elevator Buckets; Cast Tooth Sprockets; Cut Tooth Sprockets; Renewable Tooth Sprockets; Elevating and Conveying Machinery
THE UNION CHAIN & MANUFACTURING COMPANY SANDUSKY, OHIO, U. S. A.
Registered UNION Trade Mark

manufacture folding and set-up boxboards, test boards and container board.

The National Paper Products Company has extensive plants along the Pacific Coast. It operates a two-machine board mill and container plant at Stockton, California, with a capacity of two hundred tons per day, and a Paper Products Converting Plant in San Francisco. It has a tissue and towel mill at Carthage, N. Y. Through an affiliated company, known as the Olympic Paper and Power Company, it operates a hydro-electric plant and a news print mill at Port Angeles, Washington. This company has been gradually extending its manufacturing facilities to keep pace with the normal increasing demand for boards, newsprint and other products which it manufactures.

New Wax Paper Mill

The Western Waxed Paper Company has purchased a site in Emeryville for its California factory, and work has been started. The property has a frontage on Doyle Street of 300 feet, extending from Sixty-second Street to Sixty-third Street with a frontage of 50 feet on Sixty-second Street and 300 feet on Sixty-third Street.

The factory building will be one story of brick and reinforced concrete with semi-fireproof roof. It will have a floor space of 30,000 square feet and will be completely equipped with sprinkler system, heating plant and electrical equipment. The building alone will cost $60,000. R. Vane Woods is the architect. H. J. Christensen has contract for foundation work and grading.

For a number of years the Western Waxed Paper Company has operated a factory at North Portland, Ore., but the greatly increased demand for its products in California has made the California factory advisable and necessary.

The new factory and all Pacific Coast business of the company will be under the management of Mr. McDonald.

Nepco's New Mill Ready

The new paper mill at Port Edwards of the Nekoosa Edwards Paper Company, known as Alexander Mill, started operation Monday, July 23rd, according to reports from the office there. This is considered a record achievement as the contract for the two machines was not awarded to Beloit Iron Works until Dec. 15th last, and the contract for the building was not let to the Meyers Construction Company until Feb. 10.

This has not only been the construction of building and machine in record time, but the completion of a hydro electric plant and the addition of two 1500 K.W. steam Westinghouse turbines to the steam plants and a three story finishing and storage building to accommodate 3000 to 4000 tons if need be.

The date set by Mr. McBain to make paper when the contracts were let, was July 1st; but the machine builders were unable to get some of the materials and the delivery date of the first machine was 60 days later than expected. However, the starting date is only three weeks late, showing the efficient way in which everybody handled the work given them to do.

E. P. Gleason, Chief Engineer, was in charge of the building and power installations with Henry M. Ford as Chief Assistant and John Walley as Construction Superintendent. Emil Vesper, of Beloit Iron Works, had charge of installing the first machine.

This is the first 12 foot Yankee machine of Beloit Iron Works make to be erected in America. It is designed to run up to 650 feet per minute and all auxiliary machinery is of capacity and quality to allow of this maximum production.

Everything in the new mill is of the latest and most approved type and many new ideas have been developed heretofore unused in the industry, including Youngchild beater rolls, which are doing good work in the Nekoosa Mill, where they were developed.

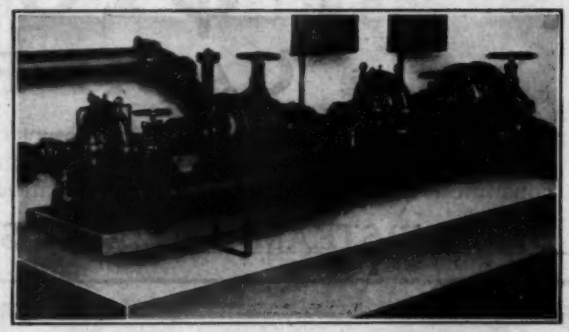
New Paper Mill in Kansas City

The American Pulp and Paper Company is the name of the new paper mill which has recently been organized in Kansas City, Mo. The mill is built of brick and a 72" Beloit Machine has been installed. Operations are expected to start by October and the present plans are to manufacture nothing but wrapping paper from waste stock.

Mr. L. L. Morgan is the President and Mr. D. H. Green, Jr., is the mill manager of the company. Mr. Green was formerly connected with the Apex Paper Company of New Orleans, La.

The Great Lakes Pulp and Paper Company of Fort William, Canada, has applied to the Canadian government for a formal endorsation of a new plant site, located on the Kaministiquia River, three miles from Fort William.

MIDWEST TURBINES AND PUMPS



of Midwest-Hill Pump and Turbine for Every Paper Mill Requirement

There is a Midwest-Hill Pump for every paper mill requirement: deep well pumps for water supply; high pressure multi-stage pumps for boiler feeding and fire protection; single stage pumps with open or enclosed impellers for handling paper stock; reciprocating pumps, both horizontal and deep well types, and steam turbine-driven generator, fan and pump units.

The experience resulting from our years of service to the paper industry is at your disposal in helping you solve your pump and turbine requirements.

HILL PUMP *and* TURBINE WORKS

Midwest Engine Corporation

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Double Stroke Deep Well Head Size 3L, Arranged for Belt Drive.

Write for Bulletin 27-C

A. D. COOK, Inc.

Lawrenceburg Indiana

Manufacturers of Single and Double Stroke and Double Acting Steam and Power Deep Well Pumps, Working Barrels, Rods, Foot Valves, Strainers and a Full Line of Water Well Supplies.

The accompanying half tone shows the design of our Double Stroke Deep Well Power Head, which is the most efficient type of Deep Well Plunger Pump.

$1000.00
CASH FORFEIT

$1000.00 Cash forfeit that the Stickle system for removing air and Condensation from the dryers and automatic regulation of steam for drying will dry more paper evenly with less steam consumed than any equipment manufactured for the same purpose under a competitive test.

STICKLE STEAM SPECIALTIES CO. **Indianapolis, Ind.**

New Sand Filter

A SPECIAL filter for paper mills, producing all the results the paper manufacturer desires. It is a modification of the well known Hungerford filter adapted to paper mill use. It is constructed of concrete, strictly wrought iron pipe, brass strainers and especially prepared silica sand. It is as durable and efficient as can be built at any cost. It can be sold at a very low figure.

This filter gives perfectly clear water, washes thoroughly, does not require renewal of the sand bed, is absolutely reliable in the performance of its duty and requires a minimum amount of attention.

Send for full particulars

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CLAYTON, N. J.

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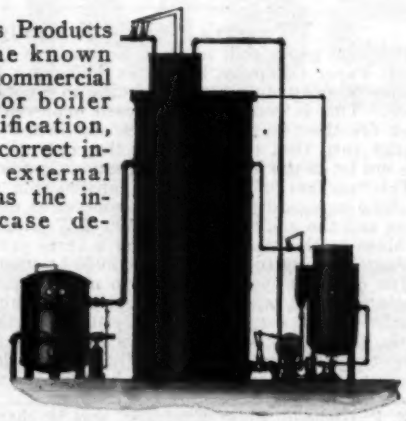
Paige-Jones Products include the known successful commercial methods for boiler water purification, permitting correct internal or external treatment as the individual case demands.



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PURIFICATION SYSTEMS
SOFTENING & FILTRATION
FOR BOILER FEED AND
ALL INDUSTRIAL USES

WM. B. SCAIFE & SONS CO., PITTSBURGH, PA.

Four Million Dollar Paper Mill for Chicago

Preparations for the erection of a new paper mill are being made by the Gumbinsky Brothers of Chicago. The new mill will be located at the corner of 31st St. and California Ave., Chicago, Ill., and will cover an approximate area of 600,000 square feet.

Mr. Oscar Gumbinsky will be the president of the new company and Mr. A. B. Thomas, a well known paper man, will be in charge as general manager. The total estimated cost of this plant is $4,000,000 and the actual construction will begin some time late this fall. Mr. A. Epstein is the architect and B. M. Baxter has been retained as the installation engineer.

Newsprint from old papers will be manufactured in the main building while two extensions will be built and equipped for the making of board and felt.

The new plant will be known as the Federal Paper Company. The estimated production is 300 tons per day.

New Plant for Bogalusa, La.

Work has been started on a new $1,500,000 paper mill in Bogalusa, La. The mill will manufacture a Kraft wrapping paper and is expected to give employment to 200 men. Pulp wood will be obtained from the farmers in the vicinity of Bogalusa.

A plant for the manufacture of salt cake will also be under the same management.

The Riverside Fiber and Paper Co. of Appleton, Wis., has started the construction of a new paper plant. The advantage of the new plant will be its short distance from their pulp mill so that pulp can be pumped in from the mill thereby saving transportation costs and time. The new plant will have a capacity of about 50 tons per day and all machinery will be electric driven. The estimated cost of this new plant is $150,000.

A raft containing 9,000 cords of spruce was recently towed across Lake Superior from Canada to Ashland, Wisconsin. It is believed to be the largest raft of pulpwood ever transported across Lake Superior. The wood will be shipped to the mills of the Consolidated Waterpower and Paper Co. of Wisconsin Rapids, Biron and Appleton.

A new 28x263 foot brick addition is being added to the Fox River Paper Company mills of Teluhah, Wis. The addition will contain a paper drying loft and also an air drying equipment, the first to be used by this mill. The estimated cost of this construction is $38,000.

Timber land owned by the Wisconsin Central Railroad has been contracted for by the Dells Paper and Pulp Company. The contract gives the company all the timber in Iron County belonging to the railroad with the exception of cordwood. The contract price is $70,000.

Receivers Appointed for Nashville Industrial Corp.

Suit has been entered by the Government against the Nashville Industrial Corporation in the Federal Court of the Middle District of Tennessee asking that the contract held by that corporation with the Government covering the sale of the Old Hickory Plant be rescinded. The Government alleges fraud in the original sale of the plant. By stipulation it was agreed that a receivership of the property would not be opposed by either side, and, accordingly, Judge Gore of the above court appointed B. P. Morse, present Manager of the Nashville Industrial Corporation, and W. P. Smith, Assistant District Attorney, joint receivers and issued instructions that the business should be carried on as usual, that sales of both realty and personalty shall be made and all activities instituted by the corporation shall continue under direction of the court.

No receivership of the Nashville Industrial Corporation was asked by the Government. Both sides have stipulated that no dilatory motions will be made and that the case shall be brought before the court for decision at the earliest date possible.

The plans of industrialization of Old Hickory will continue, as it is the desire of both the Government and the Nashville Industrial Corporation that an industrial city be made of this war expenditure.

All sales contracts made by the corporation and now existing will be taken over and consummated by the receivers, who will operate as Old Hickory Powder Plant Receivers.

PRATT & CADY VALVES

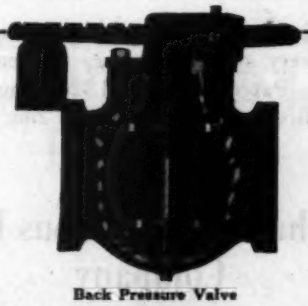
THE Pratt & Cady Bronze Gate Valve, Fig. 86, for 125 pounds steam working pressure is a valve of exceptionally high quality.

Keep your maintenance costs low by using this valve.

Fig. 86

Reading Steel Casting Co., Inc.
Pratt & Cady Division
An Associate Company of the American Chain Co., Inc.
General Sales Office: Bridgeport, Conn.
929 Connecticut Ave.

Boston Cleveland Houston Philadelphia
Charlotte Detroit St. Paul Pittsburgh
Chicago Hartford New York San Francisco
Rochester



Back Pressure Valve

The Cost of Experimenting Is High

The Davis Back Pressure Valve is one of the many tried and tested Davis valve specialties—a line of equipment for the automatic regulation of pressure that answers all demands of the paper mill operator.

With Davis to draw on there is no need for costly experimenting—no need for dissatisfaction—no need for trouble or repair—half a century of refinements, testing and advancement have put valve perfection within the reach of every operator.

Send for the complete Davis Catalog.

Write to the G. M. Davis Regulator Co., 414 Milwaukee Ave., Chicago, for your copy.

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SPECIALTIES

PAINT PROBLEMS
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SACOLITE MILL WHITE

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PAINTS FOR PAPER AND PULP MILLS

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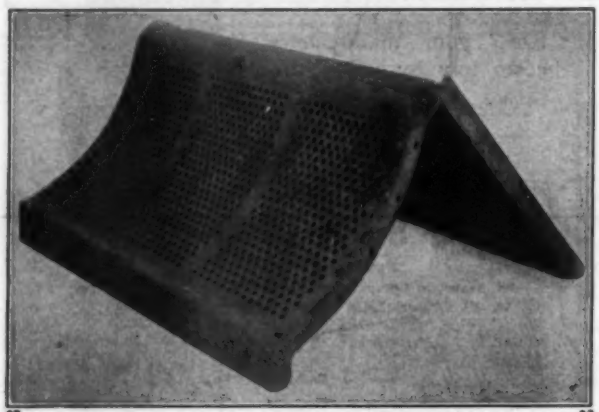
Explain your troubles to

STEWART-ADAMS & CO.

430 NOBLE STREET
CHICAGO

PAPER AND PULP MILL PAINT SPECIALISTS



Because there are no moving parts this is a very simple but very efficient device. Patent No. 1,271,426 issued to Mr. Brownell Buehler, July 2nd, 1918.

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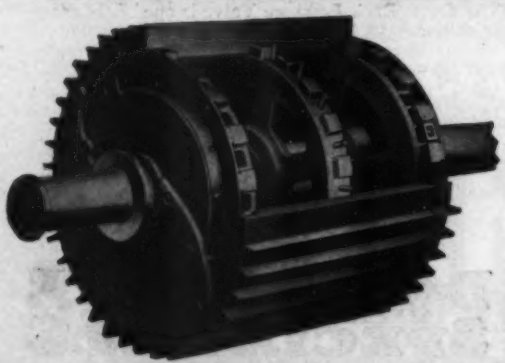
MIDDLETOWN, OHIO

"Dayton" Beating Engines are Built for Heavy Duty

Dayton Beater and Hoist Co.
DAYTON, OHIO



Dayton Globe Iron Works
DAYTON, O.

We manufacture Beating and Washing Engines, Head Gates, Hoists and Gears.

Our Wedge Type Bandless Roll made of semi-steel with special alloy bars is practically indestructible.

Foreign Correspondence

Paper Industry of Switzerland

It has been estimated that Switzerland is favored with water power about 2 H.P. per head of population, which could be turned to use, but only 6 acres forest area per head. The first is favorable to the paper mills, the latter not. The paper industry is chiefly located in the North, in the Kantons Bern, Solothurn, Aargau, Basel. Of some importance as regards size and modern arrangements are only 10 factories, and there are 4 middle sized factories. The remaining 22 do not amount to much. Forty machines for making paper and 50 for boxes, etc., are in use. Ten firms produce wood pulp and 5 sulphite. The manufacture of parchment and other oil-tight paper exists for in Switzerland there is much demand for these sorts considering the wide-spread dairy and chocolate industry. Nine works make writing paper, 10 ordinary printing paper, 5 such for newspapers, 15 for wrapping, 3 for blotting, 9 specially prepared paper for various purposes and 23 pasteboard and other cardboard. The famous watch and textile industry are the largest consumers for wrapping paper and cardboard. From 1913-20 the importation of Swedish paper and cardboard rose continuously, but during the last two years Switzerland was successful to push her own industry and the importation dropped with the exception of printing, writing and drawing paper. The whole industry is well organized and for most of the larger consumers a central sales office has been established in Luzern, especially for the inland market.

Paper Market in Soviet Russia

The chief consumers in Russia are the government, the state publishers and the newspapers to whom goes about 85 per cent of the total paper production. The remainder is taken by the numerous tobacco and cigarette firms, match factories, wall paper and reel works and other industrial establishments. There is practically nothing sold to the flat country except cigarette paper. In the paper trade the private firms and co-operative societies do not play a noticeable part. Until the second half of 1922 Moscow was the only market for paper goods, and nearly the only one for paper. Later, from the middle of 1922, the provinces also appear as consumers. After Moscow the first place is taken by Petrograd, which takes 80,000 pud per month, followed by the Ukraine, taking 80 to 100,000 pud. In the Volga district and the South East the monthly consumption is about 20,000 pud. Trans-Caucasia acts chiefly as distributing place for the export to Persia which latter country needs about 15,000 pud per month, while the Siberian market requires twice as much.

The manufacture of paper has been always less than the demand since the revolution. Especially material for newspapers is imported from abroad in large quantities since the Russian plants are not fitted for this sort, besides the ready product is dearer than the imported one. The home works are very reluctant to make this kind of paper the price of which is more unfavorable than is the case with other sorts of printing paper. For the latter there is much demand and the works are fully occupied. During the first years of revolution there was a terrible waste of the paper stocks caused by the newly created paper trusts; only during the last year the prices have somewhat equalized and made steady.

Paper Situation in Germany

Since the invasion of the Ruhr zone and the subsequent fall of Germany money, prices for any kind of commodities have risen as never before, this applies to paper. Manufacturers and wholesalers are at a loss how to make correct calculations. As soon as one has found out, after very difficult investigations, the costs of production and has then fixed the sales prices, the mark has made another deep fall, the workers demand more wages and this often with retroactive effect, and the old calculations are upset. With a business deal where extended payment has been granted, one never knows whether one has really made some profit or has even suffered a loss, when after some weeks actual cash is forthcoming which has then lost in purchasing power. The wholesale trade for paper has certainly had some losses by too liberal granting of credit. Owing to the constantly changing prices any fixed offer is rendered impossible. When in former years some customer asked the price of printing booklets, posters or any other article of paper and cardboard where some quantities were in question, the printing firm made inquiry at some wholesale firm as regards prices and samples of paper, etc., and then was able to make the customer an offer. If the latter accepted and gave the order, the firm then purchased the required raw material from the

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Port Huron, Mich. Petrolea, Canada

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Steam cannot circulate freely through machines which are clogged with condensation. Heat cannot penetrate rapidly through moist heating surfaces. Both of these conditions can be remedied by a Morehead Back-to-Boiler-System.

Drain your dryers, evaporators, paper machines and mill heating system with a Morehead System and they will be piping hot every minute. Production will rise, costs will drop and fuel bills will be materially cut.

Morehead Systems not only drain such equipment constantly, but return the condensation to the boilers as feed water, without pumps, at temperatures as high as 360 degrees. Write and learn what we are doing for others and can do for **you** in the way of bigger production or lower costs.

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Morehead

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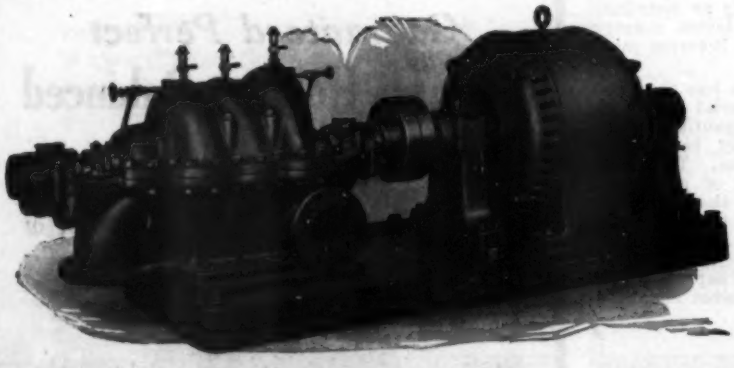
POSITIVELY DRAINS ALL TYPES OF STEAM APPARATUS. DELIVERS CONDENSATION AND FEED WATER TO BOILERS UNDER ALL CONDITIONS AT MAXIMUM TEMPERATURE



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Sent on request

For example a 3" 5 stage pump in operation in a paper mill has only been packed once in two and one-half years. This pump is balanced by the Allis-Chalmers automatic hydraulic balancing device (which is very simple) and when this pump was opened for inspection the original tool marks still showed on the balance disc.

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Agricultural Machinery
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wholesaler according to the price given some days ago. This proceeding is today impossible, for if only a day or two has elapsed between the inquiry and the actual ordering, the prices have changed again. The firms needing paper and cardboard and the customers are much worried, but the wholesale trade has not the power to alter the unpleasant conditions.

The trade journals of various industries have suggested that instead of the papermark the goldmark, or some similar steady means of payment which would facilitate calculations be created. The famous league of book sellers extending over the whole empire dictates from the headquarters at Leipzig every week the so called Key figure or Multiplicator. In the advertisements, the catalogues and in the shops and show windows the books are marked with a ground price mostly the pre-war price which if multiplied with the key figure gives the salesprice at any time. Thus it is not necessary to print every week new catalogues with the most recent prices for only the groundprice is given and the daily papers throughout the empire state what is the key figure for the present day or week. The system is gradually adopted for other things made of paper such as periodicals, calendars, or paper goods which contain at least some printed lines.

While the whole industry and trade is suffering under such conditions, yet they live in paradise if compared with the fate of those unfortunate ones living in the Rhine and Ruhr zone.

Some weeks ago the annual meeting of the society of German paper makers took place in Dresden to which delegates even from foreign countries came where they gave lectures. Owing to the very troubled times there was much material for discussion. For some time the government has allowed the exportation of certain goods without a special permit. Lately paper and certain goods made of it belong to this free list. Instead of the export permit those goods have to be accompanied by a statement that foreign bills of exchange have been furnished to the Imperial Bank. This is quite a recent law affecting all exported goods. The official name is "Regulation concerning facilitating exportation" but this name is not quite correct, some people say, it means a hindering of exports. Now our exporters have to distinguish three kinds of goods: 1—absolutely free for export; 2—those having been placed on the free list according to the new law; 3—those where a permit is demanded.

It takes a certain time until the firms and the custom officials master this new division into three classes, delays are thus unavoidable. There are also difficulties with mixed shipments, viz., if some goods belong to the first group, some to the second and third. Thus it may happen that the exporter has to supply for each of the three groups the necessary papers viz. the ordinary freight bills, an export declaration, a statement as regards supplying foreign banknotes or checks, a note for the Statistical Office, and perhaps also a testimonial as to the origin of goods for those countries demanding it. This makes increased trouble and labor for the custom offices, and the number of officials and employees has to be enlarged. Taking the new law as a whole the disadvantages are at least as great and as many as the advantages, and the industrials including those of the paper industry are not too cheerful. It is very hard to make prophecies as the future is quite dark.

Paper Market in the East of Europe

The economic life of Austria has been much affected by the fall of the German mark followed by that of the Polish and Hungarian kroner, also by the rise of the Bulgarian lews. All calculations are thus upset and many a promise of modest profit, proves to be some loss. The Austrian export trade is today more difficult than ever, which is a serious fact since the Austrian paper industry has to depend on the foreign market. The inland customers are too few for the large production. The export to the West is much handicapped by the occupation of the Ruhr zone by the French. In France and Belgium the Austrian agents must reckon with the deep antipathy against anything resembling or being German.

In both countries the Czecho-Slovakian paper is preferred at present chiefly for political reasons. Material from the northern nations is also much in demand. The Norwegian, Swedish and Finnish mills maintain in France and Belgium consignement stocks from which the customers there can be quickly supplied. The Austrian factories cannot maintain such stocks, they cannot even accept the payment conditions of the customers there unless they are well supplied with capital. The French and Belgian buyers wish to pay only after having received the ware, most even demand some extended credit. This of course is out of question to the

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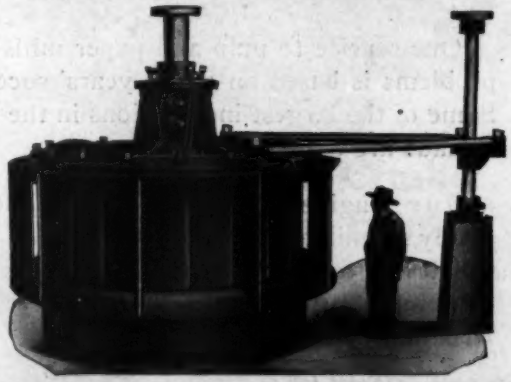

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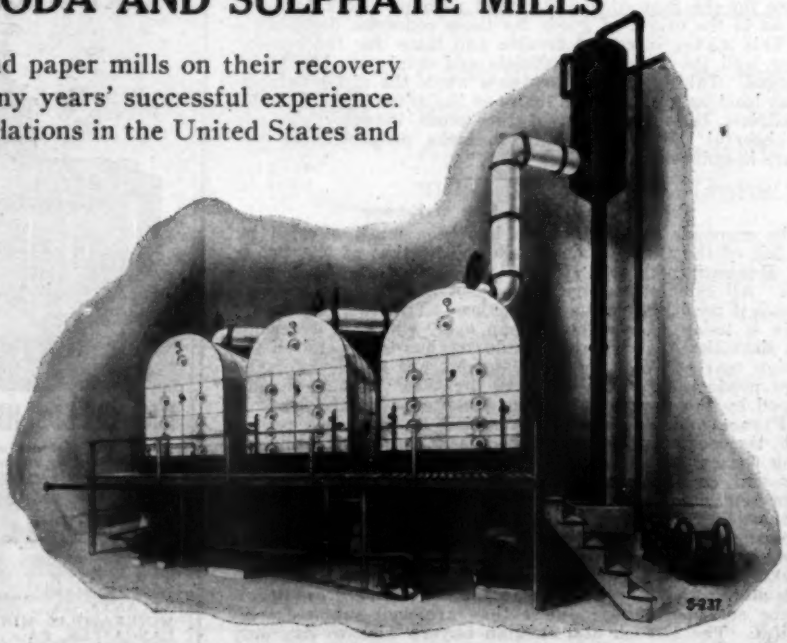

Standard Swenson Horizontal Tube, Triple Effect

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impoverished Austrians. In Great Britain the Austrians have to face German competition, for the German firms supply very cheap. Compared with the latter the Austrian firms are at a disadvantage since the transport to England is dearer and more cumbersome. Austrian exporters can choose the way via Trieste, but this is too far for Atlantic and British ports, and besides higher freight charges, the goods have to be packed seaworthy. When shipped via Hamburg to England simple wooden boxes are sufficient since the way is short and steamers leave there almost daily. The English customers prefer to buy in Hamburg and grant even a somewhat higher price.

Much more favored as regards transportation are the firms in the Czecho-Slovaky. These send their products down the Elbe via Dresden to Hamburg and from there to any part of the world. The paper made there is favored when entering France or Belgium as regards custom charges and Austrian firms endeavor to be placed on equal level, making negotions with France.

Just as many difficulties are encountered with the export to the East. In Hungary foreign checks which serve as means of payment are given to the importers insufficiently so that they cannot pay even their old debts. After their laws the so called sales tax must be paid at first at the frontier and then a second time when the goods are put into circulation. This double tax acts like a high protective tariff. The economical policy appears to be more confused every day, no wonder that the Hungarian crown is sinking. In Southern Slavonia and Roumania the traffic with other nations is much handicapped. There are domestic or inland dinars and foreign dinars, in Roumania there are free and restricted credit accounts of leis, and it lasts sometimes months until the foreign seller receives the actual cash. He suffers many losses since the value of the lei falls. In Bulgaria the rapid rise of the lews has disturbed the economical life. Although one appreciates the higher value of the national coin, it takes some time until the various economical circles get accustomed to it. The prices for everything go down. The foreign sellers with credit accounts in lews must reckon with some deductions. Generally that country is quite a good market for paper, for the trade and industry is improving.

Paper Industry in Poland

Poland, possessing all essential elements for the development of the paper manufacturing industry, has not yet reached the point where the internal consumption is covered by home production.

Notwithstanding Poland's wealth in timber especially suitable for producing pulp, only one pulp mill is active, delivering about 21,000 tons of pulp yearly. As the average consumption of pulp by the paper mills amounts to about 42,000 tons yearly, Poland has to import 50 per cent of its pulp, chiefly from Czecho-Slovakia, Austria and Germany. Some pulp is imported from America.

The paper industry of Poland is experiencing difficulties in covering its wants in linen and cotton scraps, and in some chemicals and dyes used in paper manufacturing. Although efforts are being made to develop the home production of chemicals and dyes, the industry is chiefly dependent on imports.

The output of Polish paper mills amounts to an average of 38,000 tons. Poland's yearly consumption of paper is about 114,000 tons. She therefore has to import about 75,000 tons of paper yearly, chiefly from Germany and Czecho-Slovakia.

Poland is producing all kinds of paper with the exception of luxury paper and some kinds of special papers for technical purposes. One of the most developed branches is manufacturing of cigarette paper, which is even exported to Russia and the Near East. During the first five months of 1922, 403 tons were exported to these countries.

J. F. Carrol Given Send Off by Port Alice, Can.

The residents of Port Alice, Canada held a farewell social on July 10, as a send off to Mr. John F. Carroll, who had been resident manager for the Whalen Pulp and Paper Mills, Ltd., at the Port Alice plant for the past 18 months.

Mr. Carroll was presented with a club bag by heads of departments of the mills and also was presented with an engraved silver shield by the school children of the town, with whom he has always been a great favorite.

Mr. Carroll will take charge of the Eddy Paper Company's 250 ton mill in Three Rivers, Michigan, as general manager.

E. V. Fox has been placed in charge of sales of the Hummel-Ross Fiber Corporation, manufacturers of pure sulphate kraft pulp and paper, of Hopewell, Va.

Your Pulp Wood Supply?

AT THE present rate of paper consumption the supply of pulp material will recede farther and farther every year and the rising cost of timber will soon be a very vital factor.

Business common sense suggests that operators should buy available timber tracts **now**, while they are to be found near at hand and at a reasonable price.

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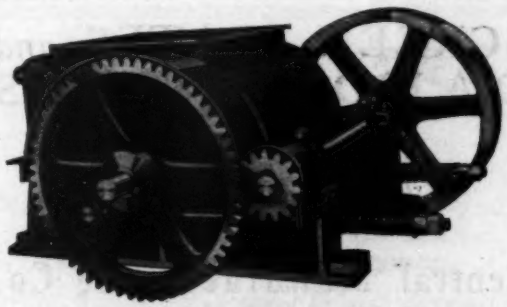

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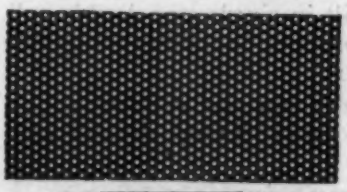
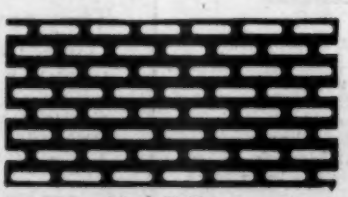
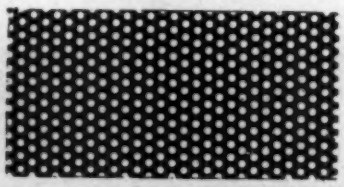
Perforated Metal Screens for Pulp and Paper Mills



.065 inch round



1/4 x 1/4" Slots



3/32 inch round

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Obituary

Thomas Beckett

Not only the papermaking industry, but the Miami Valley in general suffered a great loss in the death of Thomas Beckett, of Hamilton, president of the Beckett Paper Company, who passed away at Mercy Hospital, Hamilton, Sunday afternoon, July 22. Mr. Beckett was 63 years old at the time of his death, which followed a twelve weeks' illness with cancer.

Mr. Beckett was identified with numerous associations of paper manufacturers, especially with Cover Paper Manufacturers' Association and with the American Wood Pulp and Paper Manufacturers' Association.

He was a native of Hamilton and the son of the late William E. Beckett, founder of the present Beckett Paper Co.

After his graduation from Hamilton High School in 1876 he at once became identified with the paper business.

In his later years Mr. Beckett took an active interest in various civic enterprises. At the time of his death he was president of the Hamilton Chamber of Commerce, vice president of the board of trustees of Lane Public Library, member of all community chest committees, vice president of the Hamilton Advertising Club, an officer of the Y. M. C. A. and a supporter of the Anti-Tuberculosis League.

Mr. Beckett is survived by his widow, seven children, one brother and two sisters.

One son, Minor E. Beckett, was recently elected to his father's post as head of the Beckett Paper Company. Although a young man, a graduate of Boston Tech. a few years back, Minor E. Beckett has received the assurance of other company officials that they will support him in carrying out his father's policies.

W. D. Hurlbut Memoriam

A brochure in memoriam of the late William Daniels Hurlbut, who died on May 21, 1923, has been distributed to his many friends and associates by the Wisconsin Traffic Association.

Mr. Hurlbut, who has been the chief executive of the Wisconsin Traffic Association for nearly 20 years, was known throughout the country as the dean of paper traffic managers, and his passing is considered a great loss to the paper industry.

Louis J. Epply

Mr. Louis J. Epply died on Saturday, July 14, 1923. Mr. Epply was associated with the Hammermill Paper Company as Assistant Advertising Manager.

Personals

I. H. Weldon, president of the Provincial Paper Mills, Toronto, and formerly president of the Canadian Pulp and Paper Association, left recently on a trip to England, accompanied by Mrs. Weldon. They will be absent for several months and Mr. Weldon expects to visit many important centres on the European continent. A dinner was tendered him, prior to his departure, at the Ritz-Carlton Hotel in Montreal by the Canadian Pulp and Paper Association.

The paper manufacturers' supplies business formerly conducted under the name of N. E. Berzen at 309 Water Street, New York, has been incorporated under New York State laws under the name of S. J. Fisher, Inc. Nat E. Berzen is president of the corporation, Samuel J. Fisher is treasurer, and D. A. Fisher is secretary. The concern specializes in old manila rope and scrap bagging.

J. J. Patricof, who recently resigned as president of the Waste Material Trading Corporation, of 135 Broadway, New York, has re-engaged in business under his own name with offices in the Park Row Building, 15 Park Row, New York, handling all grades of domestic and foreign papermaking rags and waste paper.

E. J. Keller, president of the E. J. Keller Company, Inc., dealers in and importers of papermakers' supplies of 200 Fifth Avenue, New York, sailed on the steamer Berengaria on July 17 for a business trip to Europe. Mr. Keller, who was accompanied by Mrs. Keller, will be abroad about two months.

William Wacht and Herbert P. Brock, of the Waste Material Trading Corporation, importers of and dealers in paper mill supplies of 135 Broadway, New York, sailed on the steamer Leviathan on July 4 for a few weeks' business trip to Europe.

John A. Murphy, associated with his father, Daniel I. Murphy, in Philadelphia, dealer in foreign and domestic paper mill supplies, sailed from New York on the steamer Olympic July 21 for an extensive trip through England, France, Belgium, Holland, Germany and other European countries. Mr. Murphy's trip will be a combination of sightseeing and business as his firm has quite a number of foreign connections.

Folke Sundblad, of the Woodpulp Trading Company, 501 Fifth Avenue, New York, sailed on July 3 for a few weeks' business trip to Europe. Mr. Sundblad will return sometime in August, and while abroad will spend most of his time among the pulp mills in Scandinavia.

It was announced last month that Mr. J. C. Bloomfield, who recently took charge of the Chicago office of the Industrial Works, was formerly with C. H. Hart & Co. This was incorrect. Mr. Bloomfield was for a number of years with R. W. Hunt & Co.

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New York, July 1, 1923.

PROBABLY the most encouraging development in the paper industry recently has been the increased inquiry emanating from numerous consuming sources for various kinds of paper. Judging from the attitude displayed by publishers and other large users of paper, consumers are commencing to look forward to their probable requirements in paper, and inquiries regarding prices and deliveries have grown in number in a way indicating that a heavy consumption of paper is anticipated during the coming fall and winter.

Current demand, insofar as the actual buying engaged in by consumers is concerned, is light for most kinds of paper. Orders are being placed without hesitancy when the need of paper is pressing, but this is the time of the year when consumption is at a minimum and it naturally follows that buyers are noticeably limiting the volume of their operations. Nevertheless the market is far from dull. The movement of newsprint and book papers keeps up at a record rate, and activity in these kinds of paper serves to offset in large measure the seasonal quietness in other branches of the trade. Moreover, the call for fine, wrapping, tissue and other papers as well as for box boards is fully up to normal for this period of the year, if not a little in excess of normal in a majority of instances, and the situation is anything but inactive.

The outlook is indeed bright. There has been a general slackening of business in all lines during the summer; this is a condition that invariably arises and the fact that the dullness developed this year caused no concern among manufacturers and business men. Instead the slowing down movement was welcomed by most producers and merchants because it was fully realized that industry in the United States was inclining toward inflation, and the customary midsummer sagging of business placed a check on the industrial situation which has been creative of a much healthier condition for the entire industrial structure of the country.

Bankers, economists, manufacturers and others are, with few exceptions, predicting good business after the summer lull. Commodity prices are gradually reacting to levels downward where new business will be encouraged; take, for example, the price of raw cotton, which today is on by far a more reasonable level than at any time thus far this year. Furthermore, there is doubtless being stored up a tremendous potential demand for various manufactured articles during the summer period of quietness, which in due time will express itself and cause a general quickening of manufacturing operations. The mere fact that inquiries for forward supplies of paper have increased to such a notable degree during the past few days is an apt sign of what is ahead for the paper industry; another plausible indication is that sentiment among paper manufacturers and dealers is confidence personified that the fall will bring exceptionally good business of very healthy character.

A considerable reduction in industrial production and a decrease in building during June and early July are shown in reviews of general business and financial conditions issued by the Federal Reserve Board and the Department of Commerce. Banking conditions are characterized as satisfactory, and the volume of wholesale and retail trade was about the same in June as in May and substantially larger than at the same time a year ago. Statistics concerning production in most industries are far from discouraging. They show a general decline in June as compared with May but were higher than in June of last year; moreover, employment was fully maintained at May's high level, while freight shipments were exceptionally heavy.

That the paper industry continued in an active position up until just prior to the usual summer reaction is shown by the last available Federal Trade Commission report, covering the month of May, which gave figures indicating that production of paper in the United States during that month was close to a record level. A total of 659,025 net tons of paper and board of all kinds was produced by American mills in May, which was the largest month's output in over a year with the lone exception of last January, when production reached 664,537 net tons. May output of paper was no less than 54,000 net tons in excess of April, and was 116,000 tons over the average monthly production based on reports covering the past five years.

There has been no let down in the demand for news print. It is probably true that consumption has declined slightly during the past few weeks—one only has to glance at the metropolitan newspapers to see that they are printing smaller issues in comparison with those issued a short while ago—but this is purely a seasonal condition based on a drop in display advertising by many retail establishments in the daily press at this period, especially in the afternoon dailies. Publishers are taking all the supply of paper they have coming to them on contract, and transient demand is good. In fact, it is no easy matter for buyers to secure spot shipments since a large majority of mills are sold up on news print and have practically no paper to divert to the open market, with the result premiums are frequently being granted for spot lots of print paper. Moreover, reports say that contracts placed by publishers in June for deliveries over the next three or six months call for larger tonnages of paper than were ordered over the first half of the year, which should insure continued capacity operation of news print plants for the balance of 1923.

The Canadian Pulp and Paper Association has issued a report showing that a new high record of news print production was established by Dominion mills during the first six months of this year, also that a new record of exports to the United States was made. This reflects, of course, the record-breaking consumption of news print in this country thus far this year, and the outlook is for a further increase in the use of print paper during the last half of '23. Certainly a new high figure of consumption will be reached in the United States this year; the only question now is how much of an increase over previous years will be established.

News print prices are firm. Transient buyers are finding it necessary to pay premiums to cover their wants as only a few mills have paper to sell to other than contract customers. Book paper quotations have steadied after having recorded slight declines several weeks ago. Most manufacturers ask around 6.50 cents a pound f. o. b. New York for machine finished book, though some grades are reported available down to 6.25 and even 6 cents. Coated book papers are quoted at 8 to 11 cents per pound, and are in fair call.

Fine papers are in routine movement. If anything, there is a larger demand than is usually noted at this period of the year but orders are generally of light volume, and mills could readily accommodate more business. Writing paper manufacturers in and around Holyoke have been severely handicapped in their operations by a strike of stationary firemen, which has resulted in the shutting down of some mills and curtailment of production in others. Deliveries of paper have been made from stock, however, and prices have not changed, though the decreased output has served to strengthen the tone of values.

Boards seem on the threshold of an advance. In fact, some manufacturers have marked up prices slightly because of the sharp rise in raw material costs. Plain chip board is quoted in the East at about $57.50 a ton f. o. b. New York, and chip at $60, but at the moment certain mills have withdrawn quotations and an advance seems imminent. There is a fair movement of boards; at least manufacturers are securing enough business to warrant five days a week operation of their plants.

Competition of foreign supplies is eliminating business in wrapping paper for domestic producers, large shipments of kraft wrapping continuing to arrive from Scandinavian and German sources. However, domestic mills are said to be keeping moderately busy on orders from converters. Wrapping paper prices are slightly lower, and the imported product is being sold at less than domestic paper in spite of the tariff and the additional duty imposed by our Government. Tissue papers are quiet and a little off in price.

The contract for timber on the Stillwater reservoir enlargement tract in New York state has been awarded to Mr. Fred C. Pierce, of Croghan, N. Y., by the State Water Control Commission. Mr. Pierce was the only one who submitted a bid. The bid was for $166,310 and was regarded as satisfactory to the board.

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Papermaking Rags

The market for papermaking rags has strengthened and there have been some fairly sharp advances in prices in certain grades. The stiffening of the market has been due to two major causes. First, demand from at least some consuming quarters has increased substantially; felt paper manufacturers have been actively in evidence as buyers and have freely granted higher prices from time to time, while other paper mills also have expanded their buying to some extent. The demand for rags of no one class with the exception of roofing stock has as yet assumed concerted proportions; buying has been of rather spotty character, and yet consumers have been sufficiently interested and have absorbed large enough amounts to create a much stronger price undertone. The second factor is that available supplies have been comparatively low. No such thing as a scarcity of papermaking rags exists but it is quite apparent that present stocks in dealers' and packers' hands are light enough to make for price firmness. Moreover, importations in the past month or two have materially declined, which in turn has reduced the available supply in this country for prompt delivery to paper mills.

It can be said that the present strengthening of the market is the outcome of the conditions which have affected the market since the reaction following the splurge in rag business in the spring of this year. During May and June demand for rags from paper mills was seasonably light; consumers kept almost entirely out of sight as buyers excepting on occasions when they were in urgent need of supplies and even then orders were limited to small lots. Prices moved steadily downward, and, as is invariably the case when values get down to low levels, supplies of rags decreased. Imports fell off to a marked degree, and domestic collections were greatly reduced. Many collectors forsook the rag industry for more lucrative forms of employment since there was scant profit in gathering rags and since the allurements in other industries were particularly marked because of the shortage of common labor. Now that demand from paper mills has quickened it is not surprising that prices of rags are on the uptrend, and it is a question how high they may go if demand keeps up at the rate it has developed in recent weeks.

Viewing the situation as a whole, it must be said that the outlook is bullish. Particularly is this so as regards old rags. Demand for new cuttings thus far has shown little expansion, due, it would appear, to the labor difficulties which fine paper manufacturers have had to contend with, which have kept bond and ledger paper mills on a relatively low scale of operation. Moreover, the collection of new cuttings does not require the number of men that is necessary for the gathering of old rags, and the supply of the former therefore has not been adversely affected, as has that of the latter, by curtailment of collections. It should be remembered that nowhere near a normal quantity of old rags has been gathered throughout the country in the past several months, and it will of course require a few weeks for collection machinery to get back into efficient working trim, and supported by attractive market prices for rags, before available supplies will increase to a point to have a checking influence on the advancing movement of prices.

At the same time, the fairly sharp rise in prices of late should go far toward bringing out larger amounts of rags. It is proverbial in the rag industry that if prices are right plenty of stock will be provided by the collectors and dealers, but paper manufacturers should realize that labor conditions in the United States generally are such today that they cannot hope to secure large supplies of rags without granting prices sufficiently attractive to induce collectors to gather the material and to make it worth while to dealers and graders to sort and pack stock for the paper mill.

Roofing rags are the most active class of rags at the moment. Certain felt mills have been generous buyers in the past fortnight and prices have scored substantial advances, market levels being fully $5 a ton above those prevailing less than a month ago. No. 1 roofing stock is readily fetching 1.60 cents a pound at dealers' shipping points, and No. 2 packing 1.40 cents, while some sales in excess of these figures have been recorded. Old thirds and blues have advanced to where paper mills are paying 3 cents a pound and higher for repacked thirds, and beyond 2.25 cents for rough packing f.o.b. shipping points. Old white rags also are firmer in price, with higher market levels seemingly in prospect.

No broad changes have occurred in quotations on new rags. Consumers are buying cuttings principally in small lots, yet dealers are anticipating a livelier market and are holding stocks with firmness. No. 1 white shirt cuttings are quoted at about 12.50 cents per pound f.o.b. New York, unbleached muslins at 11.50 cents, light silesias at 8 cents, blue overall cuttings at 8 cents, and washables at 4.75 cents, and only in exceptional cases are purchases to be effected at less than these prices.

Foreign rags display a rising price trend, and roofing stock has appreciably improved its position. Dark colored cottons have sold at 1.50 cents ex dock New York, while foreign linens and blue cottons are quotably higher.

Average quotations f.o.b. shipping points and ex dock are:

New Stock—	New York and Chicago
White shirt cuttings, No. 1	12.25-12.50
White shirt cuttings, No. 2	6.00- 6.25
Fancy shirt cuttings	5.75- 6.00
Washables, No. 1	4.75- 5.00
Unbleached muslins	11.25-11.50
White lawns	11.00-11.25
Overall cuttings, blue	8.00- 8.25
Black silesias	4.75- 5.00
Light flannelettes	10.00-10.25
Canton flannels, bleached	11.00-11.25
Canton flannels, unbleached	9.75-10.00
Shoe cuttings, bleached	9.75-10.00
Shoe cuttings, unbleached	8.00- 8.25
Light silesias	8.00- 8.25
O. D. khaki cuttings	4.50- 4.75
Mixed khaki cuttings	4.00- 4.25
Corduroy cuttings	3.75- 4.00
Cottonade cuttings	3.75- 4.00
Linens, No. 1 white, foreign	14.50-15.50
Light prints, foreign	5.25- 5.50
Old Stock—	
Whites, No. 1, repacked	7.00- 8.00
Whites, No. 2, repacked	4.25- 4.75
Whites, house soiled	2.65- 2.85
Whites, street soiled	2.40- 2.60
Lace curtains	3.75- 4.00
Thirds and blues, rough	2.25- 2.50
Thirds and blues, repacked	2.75- 3.25
Black stockings	3.00- 3.25
Cotton canvas, No. 1	4.00- 4.25
White cotton batting	4.50- 4.75
Roofing, No. 1	1.55- 1.65
Roofing, No. 2	1.40- 1.50
Dark colored cottons, foreign	1.50- 1.60
Blue linens, foreign	3.75- 4.25
Grey linens, foreign	5.75- 6.25
White linens, foreign	10.00-10.50
Light prints, foreign	2.75- 3.00

Rope and Bagging

Several months ago when rag stock and waste paper were greatly neglected by paper mills, old rope was the one grade of papermaking material which was in good demand and which held firm in price. Today just the opposite is true. Old rope is wanted by consumers in but small amounts and prices are weakening, whereas nearly all other descriptions of raw stock for the paper mill are in lively demand and prices on the uptrend. The reason for the easiness in old rope appears to be none other than that the leading paper mill buying agency is out of the market excepting for occasional small-lot purchases and that this foremost buyer has been for sometime but casually interested in old rope. Quotations have gradually moved off until No. 1 domestic manila rope is available at 5.50 cents a pound at dealers' shipping points and probably at less; in fact, some scattered sales down to 5.25 cents have been recorded. Foreign rope is relatively weak and is quoted by New York importers at 5.25 to 5.50 cents per pound ex dock, although offerings are of light volume because of the stiff

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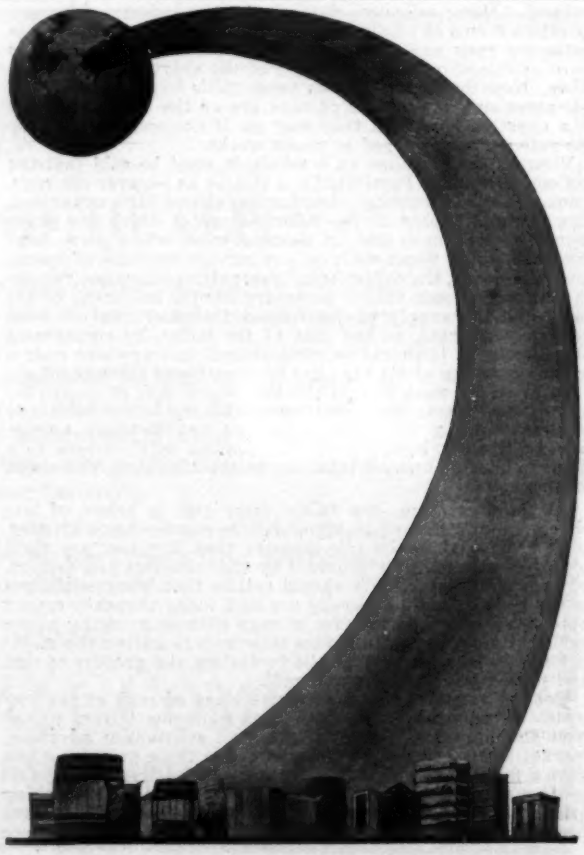


prices European dealers are demanding. It is asserted that accumulations of old manila rope among dealers are abnormally small notwithstanding the slow movement of supplies toward mills recently, and the contention among sellers is that any increase in demand would make almost immediately for an advance in prices. Strings are fairly active and are steady in price. Sisal strings especially are wanted, and in large quantities are worth 2.25 cents a pound at dealers' shipping points, while mixed strings are selling at from one cent a pound upwards.

There is not much life to the market for bagging. Paper mills are buying on a reserved scale and seem to be filling their requirements at very nearly their own prices. No. 1 scrap burlap is bringing 1.15 to 1.25 cents per pound f.o.b. shipping points, and roofing bagging 90 cents a hundred pounds. Gunny bagging is quoted at around 1.35 cents a pound for domestic and 1.25 cents for foreign.

F.o.b. shipping point quotations follow:

	New York and Chicago
Gunny, No. 1 domestic	1.30-1.40
Gunny, No. 1 foreign	1.20-1.30
Scrap bagging, No. 1	1.15-1.25
Roofing bagging	.85- .95
Wool tares, heavy	1.50-1.65
Wool tares, light	1.40-1.50
Manila rope, No. 1 foreign	5.25-5.50
Manila rope, No. 1 domestic	5.25-5.75
Sisal strings	2.00-2.25
Mixed strings	1.00-1.25

Old Paper

What constitutes a near boom has developed in old paper during the past several weeks. Demand for practically all grades has improved to a pronounced degree, and the broader buying interest of consumers, coupled with what appears to be an actual scarcity of material, has carried prices to much higher levels. Indications are that the advance in market values has been due more to conditions at the supply end than at the consuming end. It is true that board and paper manufacturers have increased their buying, but the real factor in the rise has been the small tonnage of stock packers and dealers have had to sell, this apparently being the direct cause of the low prices which prevailed up to a short time ago and the resultant curtailment of collections. Since prices have improved collections have proportionately increased, and it is likely that larger supplies will soon place a check on the upward movement of values.

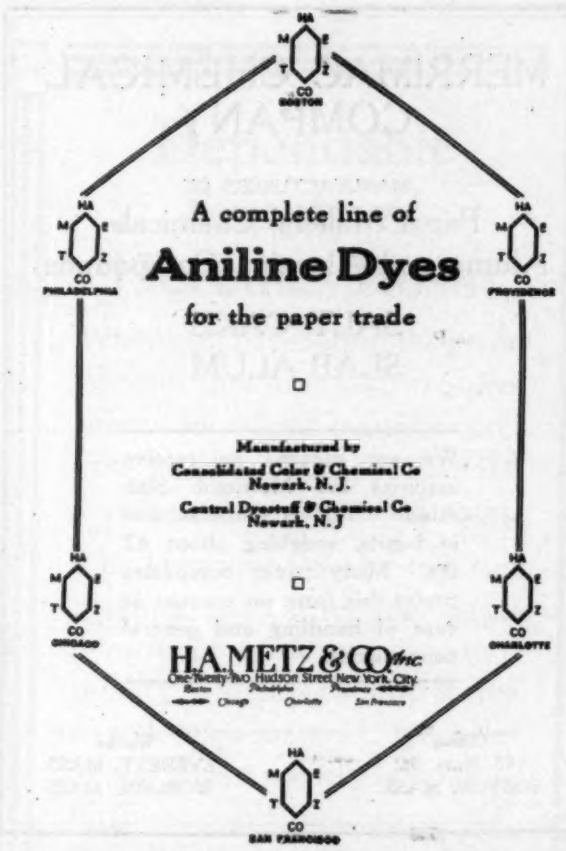
All kinds of old paper have figured in the price advance. Low grades have risen proportionately more than the higher qualities, reflecting the fact that the cheaper descriptions of stock had sunk to relatively lower price levels before the uptrend in the market set in. Old folded newspapers are quoted at around 1.05 cents a pound f.o.b. dealers' shipping points, and most sellers ask a dollar or two per ton above this figure. No. 1 mixed paper is selling at 90 cents a hundred pounds and higher at dealers' points, common mixed paper at 60 cents, overissue newspapers at 1.30 cents a pound, and box board cuttings at one cent per pound. Book stock has advanced sharply and dealers quote a minimum of 2 cents per pound at shipping points for No. 1 heavy books, and 1.70 cents for crumpled books, while most quotations are beyond these rates. Shavings are firm at from 4.25 cents a pound upwards for No. 1 hard white, and around 3.40 cents for No. 1 soft white shavings. Old kraft paper is strongly quoted at 2.25 cents per pound.

F.o.b. shipping point quotations are:

	New York and Chicago
Hard white shavings, No. 1	4.25-4.50
Hard white shavings, No. 2	3.75-4.00
Soft white shavings	3.25-3.50
Colored shavings	1.90-2.00
Heavy book, No. 1	2.00-2.25
Crumpled book, No. 1	1.70-1.85
Ledger stock	2.10-2.25
Kraft, No. 1	2.25-2.35
Manilas, No. 1	1.30-1.40
White blank news	2.00-2.10
Over-issue news, No. 1	1.30-1.35
Folded news	1.05-1.15
Mill wrappers	1.10-1.20
Boxboard cuttings	1.00-1.05
Mixed paper, No. 1	.90- .95
Common paper	.60- .65

Chemical Pulp

Domestic producers of wood pulp are basing their expectations for better business and higher prices in the near future on the bullish conditions obtaining in the foreign pulp markets.



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It is generally conceded that Scandinavia will not have normal amounts of pulp to send to the American market this year, owing to strikes of pulp mill workers in both Norway and Sweden and the large loss of production in those countries during the life of the strikes, and also owing to the heavy buying of Norwegian and Swedish pulps by British and other European paper manufacturers thus far this year. The belief existing among domestic pulp makers is that in the fall paper manufacturers will find it necessary to absorb much larger supplies of domestic sulphite and kraft pulp, and that in consequence the domestic pulp industry will experience one of the liveliest periods later this year it has ever before enjoyed.

At present demand for pulp is of rather conservative character. Consumers are buying, of course, but there is little disposition shown to order other than supplies actually and directly needed. The contract movement from pulp to paper mills is comparatively large; particularly is this so as regards unbleached sulphite for news print mills and soda pulp for book paper plants. Moreover, with the possible exception of bleached sulphite, all grades of pulp exhibit a steady price tone. Prime unbleached sulphite is selling at about 3.50 cents a pound f.o.b. producing mills, and easy bleaching sulphite has brought up to 3.75 cents. News grade sulphite is firm at around 3.25 cents per pound, and kraft is freely fetching between 3.25 and 3.50 cents a pound at pulp mills, depending on the quality and tonnage. One of the largest manufacturers of kraft on this continent reports receiving 4 cents a pound delivered paper mills for the best grade of kraft pulp.

Producers are maintaining quotations on bleached sulphite but they are privately granting price concessions. The foremost domestic manufacturers ask 5 and 5.25 cents for No. 1 bleached at pulp plants, but sales down to 4.75 cents, and even lower, are reported from time to time, indicating that producers are in want of business. Bleached soda pulp rules steady in price at between 4 and 4.25 cents a pound at shipping points.

F.o.b. pulp mill quotations are as follows:

Bleached sulphite	4.75-5.25
Easy bleaching sulphite	3.50-3.75
Unbleached sulphite, No. 1	3.25-3.50
News grade sulphite	3.10-3.30
Soda pulp, bleached	4.00-4.25
Mitscherlich, unbleached	3.50-3.75
Kraft, No. 1	3.25-3.50
Screenings, refined	1.50-1.75

Mechanical Pulp

This is the time of the year when mechanical wood pulp usually displays a strengthening tone, and the market at present is following the midsummer custom in exhibiting a rising price trend. Demand for ground wood is fair; there is no tremendous volume of buying but consumers are absorbing sufficient tonnage to remove the great bulk of supply offered, and what is a more important market factor is that low water in many grinding districts is obliging manufacturers to curtail production and thereby prompt them to hold any surplus stock they may have with increased firmness.

Reports have been heard of sales of domestic ground wood of prime spruce quality for ready shipment at as high as $40 a ton f.o.b. pulp mills. A more representative market level, however, would seem to be a couple of dollars per ton below this price, say around $37 or $38 a ton. Quotations depend, of course, on the length of the haul from producing to consuming points and the consequent freight rate, but sellers assert that $50 a ton delivered paper mills is a fair market basis which consumers do not seem to mind meeting when in want of supplies. The market in Canada is reported firm with producers across the border quoting proportionately the same prices as are named by domestic grinders.

Chemicals

The price trend in casein continues downward and there have been reports of sales at 15 cents per pound, while the probabilities seem to favor buyers securing some supply at slightly under this level. Bleaching powder is quotably steady at around 1.65 cents per pound at works for bleach in domestic drums. Caustic soda and soda ash are holding their own in price at an average of 3.10 cents a pound for the former and 1.65 cents for the latter. China clay is in moderate demand and quotably steady. The movement of papermaking chemicals is fair though chiefly against contracts at the present time.

Average quotations are as follows:

Alum, lump ammonia	3.25- 3.50
Alum, lump starch	3.75- 4.00
Blanc fixe, powdered	4.00- 4.25
Bleached powder	1.60- 1.75

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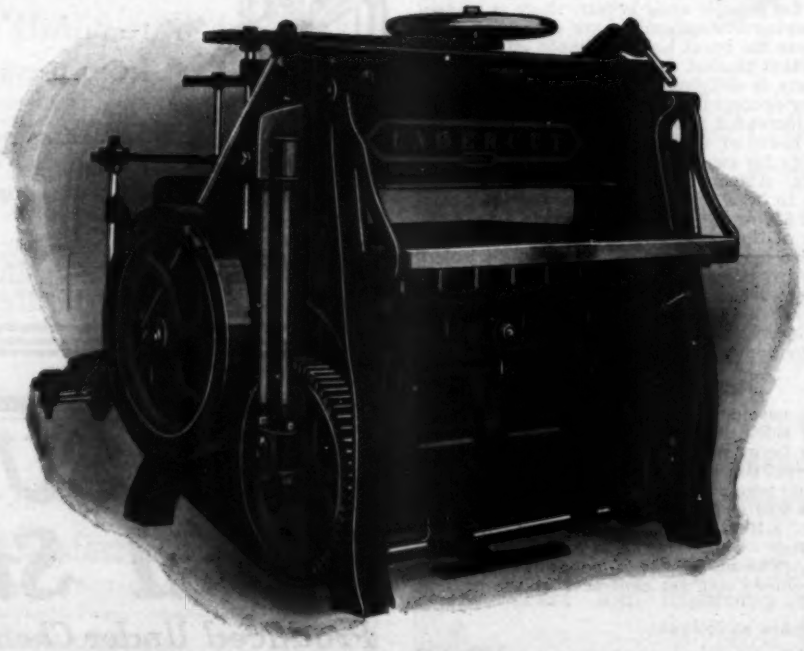

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Writing—	
White rag	20-45
White sulphite	12-30
Colored rag	16-40
Ledger—	
White rag	20-50
White sulphite	14-30
Colored sulphite	15-30
Colored rag	16-50
Bonds—	
White rag	19-45
White sulphite	10-30
Colored sulphite	11-30
Colored rag	18-45
Book—	
No. 1 S. & S. C.	6.50- 7.25
Machine finished	6.25- 7.00
English finished	6.50- 7.25
Coated and enameled	8.00-12.00
Lithograph, M. F	9.00-14.00
News print—	
Rolls, contract	3.75- 4.00
Rolls, transient	4.00- 4.25
Sheets	4.25- 4.50
Side runs	3.25- 3.50
Cover Stock—	
Coated, both sides	10.25
Coated, one side	10.15
Tissue—	
No. 1 white, 20x30	.80- .90
No. 2 white, 24-36	.70- .80
No. 1 manila, 24-36	.70- .80
Kraft	1.00- 1.25
Wrappings—	
No. 1 Kraft	6.50- 7.25
No. 2 Kraft	6.00- 6.50
Boards—	New York and Chicago
Solid news	65.00-70.00
Straw	60.00-65.00
Plain chip	57.50-60.00
White coated chip	80.00-85.00
Manila coated chip	75.00-80.00
Binders' board	85.00-90.00

CHEMICALS—(Continued)

Brimstone (long ton, at mine)	18.00-20.00
Casein (duty paid)	15.00-16.00
Caustic soda, spot delivery	3.00- 3.25
China Clay, domestic washed	13.00-15.00
China clay, foreign	15.00-22.00
Rosin, grade E	6.10- 6.15
Satin white	1.50- 1.75
Soda ash, 58 per cent light (bags)	1.50- 1.75
Starch, papermakers', in bags	2.80- ....
Talc (ton)	14.00-16.00

McKay New V. P., Seaman Company

George M. Seaman, President of the Seaman Paper Company, and also President of the Eddy Paper Corporation, has announced the appointment of Major Alexander J. McKay, as Vice President and Assistant to the President, of the Seaman Paper Company. Mr. McKay took up his new duties on Monday, July 9th, and will be permanently located in the General Offices of the Seaman Company in Chicago. This brings into the Seaman Paper Company one of the best known men in the industry, not only from a manufacturing standpoint, but from a sales standpoint as well.

Mr. McKay was for ten years associated with the Combined Locks Paper Company at Appleton, Wisconsin, as Vice-President and General Manager. When he and his associates took over the Combined Locks Paper Company, the total capacity of these mills was about 15,000 tons per year. They are now producing approximately 30,000 tons of light weight catalog, which is equivalent to 45,000 tons News, per year. Under Mr. McKay's supervision, the mills were almost completely reconstructed as regards buildings and equipment.

The citizens of Appleton tendered a public farewell dinner to Mr. McKay on the occasion of his leaving, at which close to one hundred persons were present.

In announcing the appointment of Mr. McKay, Mr. Seaman made the following statement:

"I have known Mr. McKay ever since he has been in the paper industry, and have had the closest business relations with him. He is a man I have long wanted to have a part of the Seaman organization, and I know that he is going to add strength to this Company in both the manufacturing and sales end. He is an all-round paper man and few know the business as well as he. Mr. McKay has some very definite ideas as regards the condition of the paper industry. The coming of Mr. McKay to the Seaman Company rounds out the organization in a way that I have desired for a long time. He will not only be active in the sales of the Seaman Paper Company and in the various mills with which we are connected, but we shall expect to use his knowledge to great advantage in the Eddy Paper Corporation, of which we are in charge in the operation, management and sales."

New Quarters for Butler Paper Corporations

The New York offices of the Butler Paper Corporations and the Butler American Paper Company, whose head offices are in Chicago, have just been removed from the Equitable Building to larger and more spacious quarters at 522 Fifth Avenue.

These offices will be occupied by Mr. J. Charles Quinn, who directs the activities of the Butler American Paper Company, which is the export division of the Butler Paper Corporations, and Mr. Joseph H. McCormick, who, in addition to his position as president of the American Paper Mills Corporation of New York City, assumes the direction of the New York branch of the Butler Paper Corporations.

Recent Publications

The woodman of mediaeval literature who was beseeched to "spare that tree" would find ample reasons why he should be so sparing, in a nicely prepared booklet written by E. T. Allen of the Western Forestry and Conservation Association. In this article, which is a reprint from the American Forestry Magazine, Mr. Allen discusses the forests of the past, present and future. The title is "America's Transition From Old Forests to New."

A small 70 page booklet composed largely of clear duotone illustrations is now being distributed by the Shepard Electric Crane and Hoist Co., Montour Falls, N. Y. The title is "A Book of Illustrated Economies" and it is altogether consistent with its title.

Some impressions and experiences of Mr. J. W. Gardner's trip around the world are set forth in a 24 page leaflet recently sent out from his office in Quincy, Ill. Mr. Gardner is president of the Gardner Governor Co., manufacturers of pumps, governors and compressors. This account of his is just a little different than the conventional round-the-world tale. In preparing this it was obviously his aim to give information that is not generally known yet of a very interesting character.

A new style of centrifugal pump, called a "series pump," is described in a catalogue just issued by the De Laval Steam Turbine Co., Trenton, N. J. This booklet will be of considerable interest to all who use centrifugal pumps.

The Ingersoll-Rand Co., New York, has just issued a 36 page bulletin describing their "Imperial" Type XPV steam driven air compressors. The description in this bulletin is aided very much by generous use of enlightening illustrations.

The Byers Machine Co., Ravenna, Ohio, has recently published a bulletin on their Truckrane. Rather an ordinary piece of advertising, it is setting forth the merits of a more-than-ordinary industrial crane. Another bulletin in this same class is one published by the Combustion Engineering Corp., New York, on their Type K Stoker.

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Agents
SUND AKTIEBOLAG
Strong Unbleached Sulphite
(Indirect Cooking)

Wood Pulp

There is a firming undertone in foreign wood pulp. Prices have displayed little actual change during the past month, but the tendency is stronger, and it seems significant that importers in general are naming firm quotations and are, with very few exceptions, refusing to do business at less than the rates asked. Moreover, offerings of pulp are far from excessive in volume. Probably just as much supply is available at present as ordinarily at this period of the year, but the strong factor in the situation does not concern the present but is what might happen later in the year.

All reports from primary sources tell of a very firm pulp position in European markets. Swedish and Norwegian manufacturers are declared to be well sold up for the remainder of the year; in the first place producers in these countries have less supply to dispose of this year than ordinarily because of the loss of production occasioned by strikes, and secondly, British and other European paper manufacturers have been active buyers of Scandinavian pulps thus far this year and have absorbed, according to reports, a good part of the supply which usually is sent to the American market. Still another market condition exists on the other side which may have important influence on the general situation later on. During the strike in the pulp industry of Sweden early in 1923 not only did the pulp mill operatives go out but the woodsmen also stopped work. The result is, it is asserted, that Swedish pulp mills are short of wood, which may lead to a serious curtailment of pulp production later this year.

New York importers, basing their views on the advices received from primary connections in Europe, are very bullishly inclined regarding the outlook. It is contended that if demand from American paper mills develops this fall and early winter in customary volume it is more than likely prices will rise to high levels because of the lack of sufficient supply from Scandinavian sources to go around. Papermakers, however, are proceeding cautiously in their buying. Most of them are placing orders freely for pulp required but there is little disposition evinced to anticipate wants to any great extent, and it cannot be said that demand at present is anything better than normal.

The Norwegian strike ended after lasting about three weeks, and pulp mills in that country are reported again working as usual. Shipments from both Norway and Sweden are moving forward freely, as is ordinarily the case in the summer, and arrivals at New York and other American ports have been on the increase recently, though it is stated that the bulk of this supply is against back orders. Importers in common report having very little unsold stock of pulp on spot in the United States. There is some surplus supply, of course, but representative importers say that aggregate stocks are substantially less than normally are carried since demand has been good enough to remove holdings and since less than the usual tonnage of pulp has been shipped over from Scandinavia on consignment this year.

In certain instances buyers are reported picking up lots of foreign pulp at price concessions; this, however, is said to be the exception rather than the rule, and to involve pulp which for some reason or another holders are anxious to dispose of quickly. The price tone generally is firm. Unbleached sulphite of strong quality is selling at 3.50 cents per pound ex dock New York or other American Atlantic ports, and importers want this same price for this kind of pulp for forward shipment from Europe. Swedish kraft is firmly quoted at around 3.35 cents a pound on the dock New York, and easy bleaching sulphite has sold at 3.75 cents ex dock. Bleached sulphite is relatively easy in price, and some sellers are reported shading asked rates. Between 4.50 and 5 cents a pound is quoted on No. 1 bleached, with secondary qualities available down to 4.25 cents and probably slightly less.

Receipts at the port of New York in July and current market quotations ex dock New York follow:

Bleached sulphite, No. 1	$ 4.50- 5.00
Unbleached sulphite, No. 1	3.35- 3.50
Easy bleaching	3.50- 3.75
Mitscherlich unbleached	3.50- 3.75
Kraft	3.35- 3.50
Ground wood, per ton	45.00-50.00

Poland Paper Co., 3,276 bls. from Trieste and 3,025 bls. from Bergen; E. M. Sergeant & Co., 1,716 bls. from Gothenburg; Johaneson, Wales & Sparre, 2,504 bls. from Gothenburg, 300 bls. from Hamburg and 14,478 bls. from Harnosand; H. Hollesen, 9,860 bls. from Bremen and 2,535 bls. from Hamburg; Lagerloef Trading Co., 1,275 bls. from Hango, 4,709 bls. from Kotka and 1,432 bls. from Helsingfors; Pagel, Horton & Co.,1,000 bls fromGefle, 580 bls from Rio de Janeiro, 2,000 bls. from Iggesund and 6,600 bls. from Harnosand; Castle & Overton, 1,869 bls. from Bremen and 366 bls. from Rotterdam; Bulkley, Dunton & Co., 1,000 bls. from Gefle, 3,350 bls. from Bremen, 2,700 bls. from Stugsund and 1,250 bls. from Iggesund; Nilsen, Lyon & Co., 125 bls. from Christiania, 300 bls. from Bergen and 300 bls. from Bergen; M. Gottesman & Co., 1,200 bls. from Bremen and 338 bls. from Hamburg; J. Versleegh, 800 bls. from Iggesund; Scandinavian Pulp Agency, 127 bls. from Gothenburg; Mechanics & Metals National Bank, 2,000 bls. from Gothenburg; International Acceptance Bank, 500 bls. from Gothenburg; Guaranty Trust Co., 671 bls. from Hamburg; Brown Bros. & Co., 645 bls. from Hamburg; New York Trust Co., 52 bls. from Hamburg; Whalen Pulp & Paper Mills, 5,100 bls. from Port Alice and 1,870 bls. from Vancouver; Tidewater Paper Mills Co., 16,226 bls. ground wood from Murray Bay, 9,925 bls. ground wood from Bridgewater and 9,759 bls. ground wood from Point au Pic; Order, 19 bls. from Gefle.

Paper Stock

A considerable drop in importations of papermaking materials into the United States was noted in July in comparison with earlier months in the year. The reason for this probably was nothing else than the low market prices prevailing on rags, rope, bagging, etc., during June and the first part of July, which obviously discouraged buying by importers from European dealers and resulted in less supply being shipped from primary sources. Imports are likely to increase in the near future, however, judging from the recent trend of the market and in view of the fact that within the past several weeks nearly all of the large New York importing concerns have sent representatives to Europe for the supposed purpose of buying up supplies.

The last available Government figures show that imports of papermaking rags into the United States during May of this year amounted to 23,000 tons, valued at $840,000, quite an increase over May of last year when importations were 7,000 tons for a value of $195,000. Our total imports of rags for the eleven months

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ended with May amounted to 174,579 tons, valued at $5,939,752. During the same period a year ago imports totaled only 92,934 tons for a value of $2,708,460. Importations of old bagging, waste paper and other papermaking material during May this year amounted to nearly 9,000 tons, valued at $228,963.

Arrivals at the port of New York in July follow:

Old Rope

Brown Bros. & Co., 461 coils from Hull, 257 bls. and 146 coils from Antwerp, 239 bls. and 151 coils from Bristol, 48 coils and 21 bls. from London and 73 coils from Rotterdam; Ellerman Wilson S. S. Line, 40 coils from London; Chemical National Bank, 186 coils from Hamburg and 81 coils from Rotterdam; M. Wolfer & Co., 28 bls. from Havana; Katzenstein & Keene, 148 bls. from Barcelona; International Acceptance Bank, 196 coils from Rotterdam and 35 coils from Bremen; S. Birkenstein & Sons, 58 coils from Hamburg; Mechanics & Metals National Bank, 42 bls. from London; Yglesias & Co., 4 bls. from Havana; E. J. Keller Co., 130 bls. from Algiers; New York Trust Co., 66 bls. from Hamburg; Guaranty Trust Co., 110 coils from Newcastle; N. Leipziger, 22 bls. from Havana; Order, 80 coils from Rotterdam, 10 bls. Marseilles, 35 coils from London and 41 bls. from Newcastle.

Old Bagging

S. Silberman Co., 146 bls. from Rotterdam; Maurice O'Meara Co., 36 bls. from Rotterdam; Union National Bank, 101 bls. from Roterdam; British Bank Of South America, 49 bls. from Liverpool and 572 bls. from Manchester; Edwin Butterworth & Co., 328 bls. from Hull and 49 bls. from Rotterdam; Schulz & Ruckgaber, 235 bls. from Liverpool; I. Dorfman & Sons, 64 bls. from Bristol; G. M. Graves Co., 116 bls. from London; E. J. Keller Co., 129 bls. from Rotterdam, 340 bls. from Antwerp and 66 bls. from Algiers; L. H. Abenheimer, 425 bls. from Rotterdam; Kidder, Peabody & Co., 223 bls. from Antwerp; Order, 82 bls. from Barcelona.

Rags

E. J. Keller Co., 128 bls. from Antwerp, 501 bls. from Kobe, 820 bls. from Hamburg, 204 bls. from Copenhagen and 187 bls. from Algiers; Stone Bros. & Victor Galaup Co., 23 bls. from Antwerp, 659 bls. from Havre and 3 bls. from Glasgow; American Woodpulp Corp., 169 bls. from Hamburg and 66 bls. from Antwerp; L. H. Abenheimer, 1,178 bls. from Barcelona; S. Silberman Co., 205 bls. from Hamburg; Castle & Overton, 101 bls. from Hamburg, 100 bls. from Rotterdam, 169 bls. from Antwerp and 56 bls. from St. Nazaire; E. Butterworth & Co., 405 bls. from Hull; Paul Berlowitz, 578 bls. from Havre and 285 bls. from Rotterdam; Brown Bros. & Co., 92 bls. from Bristol; Katzenstein & Keene, 44 bls. from Rotterdam; Wilkinson Bros. & Co., 41 bls. from Rotterdam; Waste Material Trading Corp., 41 bls. from Rotterdam; Goldman, Sachs & Co., 404 bls. from Bremen; J. M. Jaffe, 326 bls. from Bremen; Maurice O'Meara Co., 76 bls. from Antwerp; M. Wolfer & Co., 24 bls. from Havana; Equitable Trust Co., 274 bls. from Marseilles, 32 bls. from Hamburg, 12 bls. from Leith and 15 bls. from Newcastle; Columbia Bank, 19 bls. from London; First National Bank of Boston, 9 bls. from Bordeaux and 16 bls. from Havre; State Bank, 41 bls. from Bremen; Chase National Bank, 73 bls. from Glasgow; Guaranty Trust Co., 137 bls. from Glasgow; Order, 56 bls. from Leith, 60 bls. from Manchester and 163 bls. from London.

Miscellaneous Paper Stock

Brown Bros. & Co., 20 bls. from Antwerp and 584 bls. from Dundee; Maurice O'Meara Co., 240 bls. from Antwerp; E. Butterworth & Co., 285 bls. from Antwerp; International Acceptance Bank, 157 bls. from Antwerp; Equitable Trust Co., 292 bls. from Antwerp and 52 bls. from Dundee; Daniel M. Hicks, Inc., 29 bls. from Dunkirk; W. Schall & Co., 37 bls. from Antwerp; Irving Bank-Columbia Trust Co., 295 bls. from

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Antwerp, 164 bls. from Hamburg and 240 bls. from Dunkirk; E. J. Keller Co., 315 bls. from Antwerp and 48 bls. from Dunkirk; American Exchange National Bank, 39 bls. from Antwerp; Atlantic Waste Material Co., 20 bls. from London; N. Leipziger, 73 bls. from Havana; J. Fyfe & Co., 114 bls. from Belfast; Order, 921 bls. from Antwerp, 37 bls. from Liverpool, 198 bls. from Dundee and 39 bls. from Havana.

Paper

Aside from continued heavy receipts of kraft wrapping from German and Scandinavian sources, imports of paper into the United States in July showed no features, judging from arrivals at the port of New York. There were usual amounts of printing, cigarette, hanging and filter papers imported, though receipts of these grades were nothing more than normal. Large shipments of wrapping paper reached New York, consigned to various concerns in the trade. Receipts of paper of all kinds through the port of New York in July follow:

Cigarette

DeManduit Paper Corp., 25 cs. from Havre and 257 cs. from St. Nazaire; Rose & Frank Co., 98 cs. from Havre and 58 cs. from Southampton; British-American Tobacco Co., 409 cs. from Hamburg and 2 cs. from Liverpool; R. J. Reynolds Tobacco Co., 510 cs. from St. Nazaire; American Tobacco Co., 900 cs. from Bordeaux; P. J. Schweitzer, 85 cs. from Antwerp and 78 cs. from Marseilles; Surbrug Co., 15 cs. from Southampton; Zorro Tobacco Co., 37 cs. from Lisbon; H. H. Strauss, 2 cs. from Havre; Costa & Miguel, 10 cs. from Barcelona; M. Spiegel & Sons, 26 bls. from Genoa; Order, 28 cs. from Barcelona and 3 cs. from Havre.

Printing

Paper House of Pennsylvania, 24 rolls from Bremen; Globe Shipping Co., 100 cs. from Bremen; B. F. Drakenfeld & Co., 101 cs. from Liverpool; Newark Ledger, 544 rolls from Gothenburg; Oxford University Press, 33 cs. from Liverpool; P. C. Zuhlke, 70 cs. from Hamburg and 196 cs. from Rotterdam; Corn Exchange National Bank, 933 rolls from Hamburg; Irving Bank-Columbia Trust Co., 242 rolls from Hamburg and 1,272 rolls from Copenhagen; M. Gottesman & Co., 259 rolls from Hamburg; Chemical National Bank, 2,709 rolls from Hamburg; American Exchange National Bank, 41 rolls from Bergen; P. Puttmann, 5 cs. from Antwerp; C. Steiner, 18 bls. from Hamburg; Ladenburg, Thalman & Co., 194 rolls from Hamburg; Maurice O'Meara Co., 193 rolls from Harnosand and 74 rolls from Bremen; Perry, Ryer & Co., 42 cs. from Glasgow; H. Reeve Angel & Co., 824 rolls from Antwerp; C. G. Keferstein, 73 rolls from Hamburg; Guaranty Trust Co., 49 rolls from Hamburg; Parsons & Whittemore, 1,607 rolls from Bremen; Order, 39 rolls from Trieste, 16 rolls from Bergen, 117 rolls from Hamburg and 937 rolls from Bremen.

Wrapping

Wilkinson Bros. & Co., 70 bls. from Libau, 3,972 rolls and 650 bls. from Rotterdam, 85 bls. from Bremen and 626 bls. and 2,156 rolls from Hamburg; Mitchell & Williams, 1,872 bls. from Trieste; Ladenburg, Thalman & Co., 2,582 bls. from Trieste and 140 bls. and 662 rolls from Hamburg; Publicity Paper Corp., 21 rolls from Trieste and 14 bls. from Hamburg; Fernstrom Paper Co., 105 bls. from Gothenburg, 21 bls. from Hamburg and 143 bls. from Harnosand; A. E. McAdam & Co., 278 rolls and 24 bls. from Gothenburg; M. M. Cohen, 254 rolls and 58 bls. from Gothenburg; Melby, Kuttroff & Co., 99 rolls from Gothenburg, 19 bls. from Hamburg and 228 bls. from Harnosand; C. K. MacAlpine & Co., 121 rolls and 68 bls. from Gothenburg; Irving Bank-Columbia Trust Co., 279 rolls from Gothenburg, 1,190 rolls and 273 bls. from Hamburg, 111 rolls from Bergen and 122 rolls and 35 bls. from Antwerp; Tompkins & Tuthill, 245 rolls and 5 bls. from Gothenburg; Peoples Trust Co., 3,607 rolls and 70 bls. from Gothenburg; Equitable Trust Co.,731 rolls and 372 bls. from Gothenburg and 179

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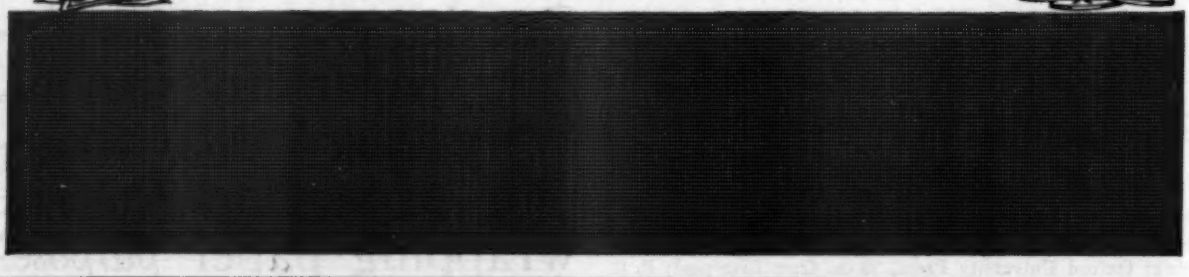

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bls. from Bergen; Corn Exchange National Bank, 1,188 rolls and 42 bls. from Gothenburg; C. Steiner, 52 bls. from Bremen and 12 bls. from Hamburg; W. E. Shuttleworth & Co., 6 rolls and 27 bls. from Gothenburg; C. G. Winans & Co., 772 rolls and 109 bls. from Gothenburg; Maurice O'Mearra Co., 107 bls. from Gothenburg, 314 bls. and 372 rolls from Hamburg, 6,137 bls. from Harnosand and 60 bls. from Bremen; Bankers Trust Co., 1,839 rolls from Hamburg; International Acceptance Bank, 834 rolls from Hamburg; Chemical National Bank, 330 rolls and 115 bls. from Hamburg; Blauvelt-Wiley Paper Mfg. Co., 100 rolls and 11 bls. from Hamburg; D. S. Walton & Co., 987 rolls and 284 bls. from Hamburg; J. P. Heffernan Paper Co., 13 bls. from Hamburg; Bank of America, 401 bls. from Hamburg; Birn & Wachenheim, 9 bls. from Southampton; Republic Bag & Paper Co., 6,195 rolls and 239 bls. from Rotterdam and 114 rolls from Hamburg; Guaranty Trust Co., 60 bls. from Hamburg; Standard Underground Cable Co., 175 rolls from Glasgow; Mead, Patton & Co., 1,389 bls. from Harnosand; Martin Walsh, Inc., 522 rolls and 386 bls. from Harnosand; Chase National Bank, 425 rolls and 80 bls. from Hamburg; E. Dietzgen & Co., 151 rolls from Hamburg; Order, 236 bls. from Trieste, 68 rolls and 831 bls. from Gothenburg, 1,255 rolls from Libau, 247 rolls and 1,141 bls. from Hamburg and 1,197 rolls and 125 bls. from Bremen.

Writing

C. Steiner, 11 cs. from Bremen; E. Dietzgen & Co., 17 cs. from Marseilles; J. W. Hampton, Jr., & Co., 2 cs. from Hamburg; Japan Paper Co., 3 cs. from Havre.

Drawing

Keuffel & Esser Co., 3 cs. from Liverpool, 5 cs. from Rotterdam and 218 cs. and 134 rolls from Hamburg; E. Dietzgen & Co., 55 cs. from Hamburg and 27 cs. from Rotterdam; A. Giese & Son, 7 cs. from Bordeaux; American Express Co., 6 cs. from Liverpool.

Filter

H. Reeve Angel & Co., 6 cs. from Southampton and 102 bls. from Bordeaux; Bernard Judae & Co., 6 cs. from Gothenburg; J. Manheimer, 139 bls. from Southampton; E. Fougera & Co., 91 cs. from Southampton; C. G. Euler, 75 bls. from Bordeaux; A. Giese & Son, 35 bls. from Bordeaux; W. Barrett & Co., 30 bls. from Bordeaux.

Tissue

F. C. Strype, 14 cs. from Liverpool; H. Reeve Angel & Co., 15 cs. from London; Meagher-Devoy Shipping Co., 11 cs. from Liverpool.

Photo

National City Bank, 19 cs. from Antwerp; Globe Shipping Co., 257 cs. from Bremen; M. G. Lange & Co., 6 cs. from Bremen; Gevaert Co. of America, 110 cs. from Antwerp; J. J. Gavin & Co., 4 cs. from Liverpool; Lithoprint Co., 4 cs. from Antwerp; F. Henjes, Jr., 87 cs. from Bremen.

Hanging

W. H. S. Lloyd & Co., 38 bls. from London, 20 bls. from Southampton and 2 bls. from Liverpool; F. G. Prager & Co., 433 rolls from Hamburg and 831 rolls from Antwerp; A. C. Dodman, Jr., & Co., 4 bls. from Antwerp and 8 bls. from Liverpool; A. Murphy & Co., 1 ble. from Liverpool; R. F. Downing & Co., 15 cs. from Havre and 28 cs. from Yokohama; International Acceptance Bank, 137 rolls from Hamburg; Holland-American Line, 31 bls. from Rotterdam; M. J. Corbett & Co., 9 bls. from Hamburg; National City Bank, 483 bls. from Bremen; F. & R. Trading Co., 105 rolls from Hamburg; Order, 3 cs. from Antwerp.

Board

Harriet Hubbard Ayer, 5 cs. from Havre; Coty, Inc., 43 cs. from Havre; O. M. Baxter, 30 bls. from Gothenburg; Montag

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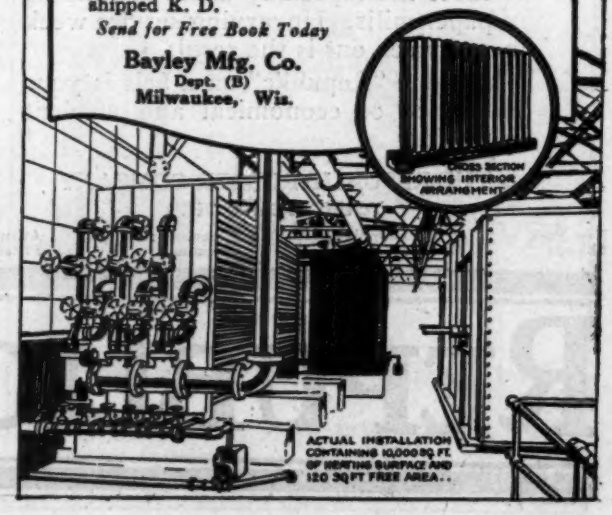
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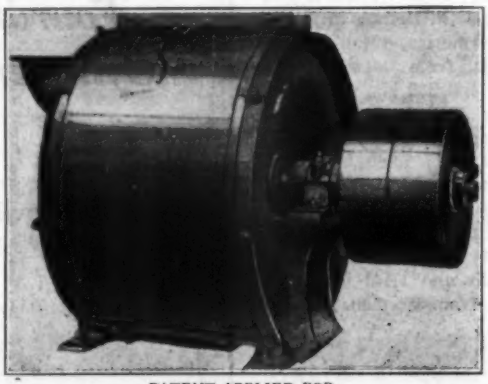

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& Cassidy, 5 cs. from Liverpool; F. Collins, 4 cs. from Hamburg; F. Oyen, 98 bls. from Hull; Irving Bank-Columbia Trust Co., 105 rolls from Hamburg; Bendix Paper Co., 79 cs. from Hamburg; Metropolitan Import & Mfg. Co., 127 cs. from Hamburg; Continental Shipping Co., 10 bls. from Hamburg; Kolisch & Co., 3 cs. from London; L. F. Phillips & Co., 4 cs. from Bremen; Maurice O'Meara Co., 340 bls. from Rotterdam; American Express Co., 6 cs. from Hamburg; Buschmann Bros., 184 rolls from Hamburg; Phoenix Shipping Co., 20 cs. from Bremen; Alpers & Mott, 27 cs. from Bremen; J. W. Levy Corp., 10 cs. from Hamburg.

Miscellaneous

Whiting-Patterson Paper Co., 27 bls. from Havre and 5 bls. from Gothenburg; C. H. Boulin, 47 cs. from Havre; Birn & Wachenheim, 29 cs. from Southampton, 25 bls. from Hamburg and 34 cs. from Havre; Japan Paper Co., 5 cs. from Gothenburg, 8 cs. from Genoa and 40 cs. from Yokohama; H. Reeve Angel & Co., 10 cs. from Gothenburg and 71 cs. from Hamburg; A. Frankan & Co., 18 cs. from Bremen; C. A. Johnson & Co., 19 bls. from Liverpool; F. L. Kraemer & Co., 13 cs. from London; Bernard, Judae & Co., 4 cs. from Gothenburg and 6 cs. from Havre; Royal Lace Paper Co., 4 cs. from Hamburg; O. G. Hempstead & Sons, 38 cs. from Hamburg; Happel & McAvoy, 19 cs. from Hamburg; F. B. Vanderift & Co., 18 cs. from Hamburg; P. H. Petry & Co., 34 cs. from Hamburg; Borden & Riley Paper Co., 19 cs. from Antwerp; H. W. Robinson & Co., 11 cs. from Hamburg; Gallagher & Ascher, 7 cs. from Havre and 2 cs. from Hamburg; Japan Fan Co., 23 cs. from Yokohama; Marshall Field & Co., 5 cs. from Genoa; H. Brockelbank, 10 cs. from London; T. Nevin, 4 cs. from London; J. W. Lyon & Co., 5 bls. from Havre; Independent Forwarding Co., 13 cs. from Havre; American Shipping Co., 4 cs. from Hamburg; Judson Freight Forwarding Co., 11 cs. from Havre; Atlantic Forwarding Co., 2 cs. from Havre; Draeger Shipping Co., 6 cs. from Havre and 21 cs. from London; Hensel, Bruckman & Lorbacher, 8 cs. from Hamburg; J. R. Liverino, 17 bls. from Genoa.

Foreign Trade Opportunities

Additional information regarding the following foreign trade opportunities issued by the Bureau of Foreign and Domestic Commerce of the United States Department of Commerce may be obtained from the Bureau in Washington, D. C., or its branch offices. It is requested that the number of the inquiry be given at all times.

No. 6975—Paper bags, linen or cotton lined, and oiled paper for outer covering. Nairobi, Kenya, Africa. Purchase desired.

No. 7018—Old papers, 500 to 1,000 tons. Boulogne-sur-Mer, France. Purchase desired.

No. 6976—Stationery. Cape Town, South Africa. Purchase desired.

No. 6990—Wall paper. Wellington, New Zealand. Agency desired.

No. 9017—Wood pulp, Paris, France. Purchase desired.

No. 6988—Kraft wrapping paper. Panama, Republic of Panama. Purchase desired.

No. 7190—Caustic soda. Porto Algere, Brazil. Agency desired.

No. 7185—Cups, paper, as jelly containers. Montevideo, Uruguay. Agency desired.

No. 7150—Paper. Buenos Aires, Argentina. Agency desired.

No. 7185—Sandpaper. Montevideo, Uruguay. Agency desired.

D. S. Gottesman, of M. Gottesman & Company, Inc., wood pulp and paper importers of 18 East Forty-first Street, New York, sailed on the steamer Mauretania from New York on July 10, for a business trip to Europe.

Made for maximum service not merely the average

TRADE JENKINS MARK

Jenkins Bros

Y or Blow-Off Valve

On account of its opening nearly in line with the pipe, this is an ideal valve for handling thick, heavy fluids. For the same reason it is widely used for boiler blow-off service. Fitted with Jenkins Renewable Disc.

Supply houses everywhere.

JENKINS BROS.

New York Montreal Boston Philadelphia Chicago London

Sectional View Fig. 124, Screwed, Standard Bronze Y or Blow-Off Valve.

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Jenkins Valves

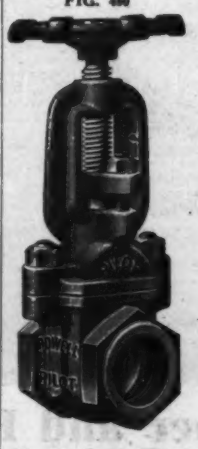
SINCE 1864

Iron Body or All Iron

"Pilot" Gate Valves

WITH OUTSIDE SCREW STEM AND YOKE

FIG. 480



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Screwed or Flanged Ends Working Pressure Up to 125 Pounds

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General Steel Plate Construction of every description.

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Builders*—Paper and Pulp Mill Machinery—*for

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